THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

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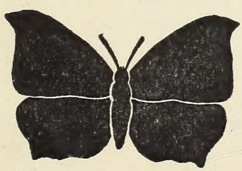
Edited by
TREVOR TROUGHT, M.A., F.R.E.S.
AND
W. J. B. CROTCH, M.A., A.K.C.



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*This list includes references to insects of which only the English names are used in the text.

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EDITED by TREVOR TROUGHT, M.A., F.R.E.S.

AES BULLETIN No. 121 JANUARY 1951

On behalf of the Council of the A E S the Editor wishes all Members a Prosperous and Happy New Year

EDITORIAL

There has been a good influx of new members during 1950 and a new membership list will shortly be required. Old members are reminded of the existence of the AES Panel of Advisers, and those new members who have not the last Membership List should address their queries to the Editor. [All queries requiring a direct reply *must* have a stamped addressed envelope enclosed.]

An interesting and welcome article in this number is that by the Southville Boys' Insect Club. The Editor believes this to be the first contribution to the *Bulletin* from a 'group' and it comes aptly after the recent articles in the *Bulletin* on 'groupwork'. The work of the small local group is of equal interest and importance with Groupwork on a wider vice-county, county or national scale.

This brings the Editor smoothly to Captain T. Dannreuther's appeal for more recorders of Immigrant Insects. This is an existing example of Groupwork on a national scale. Perhaps, in deference to Irish, Scots and Welsh members and the fact that the Insect Immigration Committee has its tentacles overseas, it would be more correct to say its scope is 'international'. This, however, is a simple recording of the arrival and recurrence of certain butterflies and moths in the recorder's district and, for those who may be fortunate enough to see a migration in progress, the noting in rather fuller detail, of numbers, direction and so on. There is a daily interest, even in the rush for the bus to the office!

BREEDING THE GOLDEN EMPEROR (*LOEPA KATINKA*, WESTWOOD)

Not having seen any account of the early stages of this fine insect, the boys of the Southville Insect Club would like to record their experiences. Last season several members (including, for a wonder, the Club president) have succeeded in rearing *L. katinka* from the egg to the cocoon.

A pairing took place on the night of June 20th, 1950, between a female which emerged that day and a male which hatched on the 19th. It was a damp night, mild but not particularly warm. The moths were placed in a corrugated cardboard cylinder 9″ wide, 15″ long, laid on its side with pieces of perforated zinc as ends, so that air could pass through freely. At midnight they were still sitting at opposite ends of this receptacle; but they had paired by the morning, remaining thus till dusk.

Each evening at dusk the female became lively and laid eggs for about an hour, but hardly any after that. The first larvae hatched on July 12th, being dark brown in colour with a touch of fawn at the tail end. They took readily to Virginian Creeper, on which they were fed throughout.

The creeper used was not the truly "Virginian" one with divided leaves of a rather thin texture, but the smaller leaved sort (now, I believe, known as *Vitis inconstans*). This has succulent leaves which keep well. The larvae were always kept in practically airtight tins, of increasing size as they grew.

By August 1st they had moulted twice, their colour scheme having remained almost the same, but now more brilliant. Both foremost and hindmost segments were now a bright orange red, the rest of the body be-

ing of a rich brown. The minute specks along the sides of the newly hatched larvae had now become large splashes of a luminous cream colour with a tint of green in it. They normally rested on the underside of the leaves, and when disturbed reared themselves into a most extraordinary attitude, best indicated by the accompanying figure based on a photograph.

In the fourth and fifth stadia (the last stage being reached by August 13th) they were of a duller hue; the flame coloured patches vanished, but the cream spots remained. The dark ground colour had complicated marblings of brown and black. In the fully grown larva the tubercles were black with a tint of navy blue. They bore rusty coloured hairs and short spines, these latter having violently urticating properties. An accidental contact raised large white lumps on one's skin. These soon subsided again, but I believed at the time the effect was stronger than in the case of *Automeris io* (The Bull's Eye Moth).

L. katinka larva.

The strange appearance of the "rearing" larva was accentuated by the fact that, viewed from above, the thoracic segments were seen to be progressively widened by curious lateral projections, giving a wedge shape to the forepart. One could almost imagine one was looking at a small hairy rodent with protruding eyes and a shiny black nose (the caterpillar's head). They reached a length of 3″.

The first cocoons were made on Aug. 29th, being of average size and the familiar boat shape. The pupae were seen through the semi-transparent walls to be formed on September 9th. Altogether, this seems a most interesting species to rear, presenting the combination of a very lovely moth and a first-rate " joke " caterpillar.

G. E. Lovell (Club President) (1567A).

The above note is very informative and accurate: the lateral blotches with their bright sulphur colour certainly give an impression of sunlight dappled through serrated leaves. Several others have reported successful rearings of *L. katinka* this year. My own fed up strongly on hawthorn, but were subject to a wasting disease in the last stadium. It is remarkable that for so long no British foodplant could be found for this silkmoth. Mr Newman still lists it as "foodplant unknown".

The caterpillar has a truly eccentric appearance in its rearing position. Seen from the front, the lateral projections referred to by the Southville Club gave a distinct likeness to a hooded cobra, particularly as the larvae do not often double themselves quite so far backwards as the one photographed. They are wonderful escapists. I suspect that in nature they leave the foodplant by day and take refuge in crevices of bark or rock. My larvae diminished in number weekly, so that, at first, I suspected cannibalism. Later I found they were able to squeeze through the merest chinks and make for skirting boards and like places. One committed suicide by climbing under and up to the top of the shaft of a mahogany lamp standard, where it created a short circuit when I switched on the light one evening.

W. J. B. Crotch (1181).

LARVAL COLOURS

Following P. G. Taylor's (719) note in *Bulletin No. 116*, p. 72, the Editor has received several articles and notes on the above subject. It would seem that an investigation on 'larval colours' could suitably be undertaken by a 'group'. The subject is clearly of interest, and the collection of *facts* in the first place and the undertaking of suitable experiments later should be of great general interest.

H. E. Hammond (423) writes:—"Every entomologist will readily agree that environment plays an important part in nature, but it does not do to generalise on this subject. It is well proved that rearing under artificial conditions (including the use of colour filters) with controlled temperatures and humidities, etc., can also play a very important part in this connection; but to state that crowded conditions (apart from pathological effects) can cause a brood of

larvae to change from green to brown raises a very debatable point.

"Several of the species named by Mr Taylor have been reared in large numbers, by me, under 'close-fed' conditions, for forcing purposes. I can therefore state with assurance that environment has played a very minor part in colour control of the larvae, in a *single brood.*

"Considering *Ceramica pisi* Linn. as an example, I find that both green and brown forms occur in captivity, in approximately the same ratio as in Nature, and in second generation larvae I have not noted any increase in the proportion of brown to green. In Birmingham, brown feral larvae predominate.

"All the *Plusia gamma* Linn. I have reared have been closely confined in their hundreds, but in no case have I seen anything but green forms.

"On the other hand, I have often found much variation amongst feral larvae of *Dasychira pudibunda* Linn., brown, plum, grey and yellow forms predominating with a green form quite scarce in proportion to the other colours. I find that pairings of brown or plum forms produce in confinement a greater percentage of these colours in second generation larvae and that yellow and green forms also produce a higher number of their own type (although, it is correct to add, numbers in each colour category may be very erratic.).

"In a state of Nature, many species produce larvae of diverse colours and combinations of colours, but in all these cases, where the forms are recurrent in generation after generation, these colours must necessarily be inherited. But if brood after brood of larvae are reared *artificially* under exactly similar conditions, any abnormal effect on each brood due to these conditions might be expected to be similar in each generation, giving a false effect of inheritance; but I suggest that if the experiment be discontinued and natural conditions reinstated, this effect will immediately be rectified by Nature and normality restored.

"Whilst not in any way disputing that differences in larval colours may be secured by unnatural methods, we must once again come back to the only possible explanation of recurrent variation and that is the application of the laws of genetics to larval colours, just as much as to the imagines".

J. B. Ogden (1580) gives the following example:—"Near my house, in Lymington, on every dock plant in the small country lanes, and even on the main road, *N. typica*, the Gothic, can be found. For two years I have attempted to bring a reasonable percentage of the hibernating larvae through the winter but with little success.

"Last year, starting in February, I began my usual search but found only three—all of which died. This marked absence almost led me to write to the *Bulletin*. In May, however, I received a shock when some eight Gothics appeared in a breeding cage used for my other hibernating species. Hitherto all my Gothic larvae were slatey-brown, but I had taken eight larvae which I could not identify (and which were obviously Gothics when they emerged) whose colour was very light brown—the darker markings on the back were inclined to be reddish. This does not agree with South's alternative colour scheme, and even if it did why on earth should all the local larvae—except three—adopt a fresh colour scheme in 1950?"

R. W. J. Uffen (1660*) records an interesting observation:—"My experience of larval colour varieties is limited, but I might mention what happened to two larvae (as yet unidentified) which I obtained on gladiolus in mid-July 1950.

"Both larvae were green with only a dorsal line. After two or three days they both turned white, with a highly complicated pattern in brown. About ten days later one went to earth and pupated, having eaten its companion."

Alan Kindred (1707*) notes on the 3rd September 1950:—"A week ago I had a larva of the Silver Y (*Plusia gamma*) given me. It was found on *Eschscholtzia*. I fed it on a dandelion. When it was given to me it was bright green, now it's in its last moult it's a dark brown.

"I've just been rearing nearly 300 Eyed Hawk larvae. I kept most of them in cages, but I had about 50 loose on an apple tree. Those on the tree were a lovely light green, while the others were a dirty dull brownish-green."

OPERATION CONVOLVULI

Having been presented with two Convolvulus Hawk Moths by neigh-

bours, one on September 2nd, 1947, and the other September 3rd, 1948, I decided, as this fine creature seemed to favour this (Lymington) district, I should make an effort to procure it myself. Thus, in the spring of this year (1950) I put, in my small garden, about a dozen plants of the sweet-scented tobacco, which produced quite a fine show of flowers.

On August 26th, before going to bed, I was inspecting the *Buddleja* blossom with the aid of a torch, and, finding only a Hebrew Character moth too engrossed to be disturbed by the light, I turned towards the house, but as the beam of the torch flashed across the garden, a large moth darted by, and hovered in the light with tongue half-coiled. I held it in the ray just long enough to see the black, red and white bands of *convolvuli* before it shot away into the darkness. How I could have kicked myself! With a net, and careful approach to the tobacco flowers, I could almost certainly have caught it, but the thought hadn't entered my mind that I might encounter it at that time.

The next day it rained hard, but August 28th was a very fine day, and the evening atmosphere was heavy and thundery. Just at dusk, about 9 o'clock, I remarked to my small son, " Well! according to the book the Convolvulus Hawk should be flying," and I opened the door to look into the garden. Immediately above my head, a dark shape suddenly appeared; I thought it was coming through the doorway, but it wheeled slowly towards the garden. I almost fell back with astonishment, and excitedly rushed for the net I had ready, tripping over furniture in my hurry; then, stealthily approaching my bed of tobacco plants, I could just see, in the dim light, the hovering form of a large moth, with its head almost buried in the bell of a flower. I poised the net directly behind, and with a sure movement enveloped both insect and plant, then, quickly grasping the neck of the net, I snapped off the stem, and carried my prize indoors for all to view.

It was a fine specimen of *convolvuli* which, after study, I concluded was a female, but as the forewings were somewhat worn, and one antenna broken, I decided to keep it alive in the hope of obtainings eggs, so it was put in a roomy cage with tobacco flowers and bind-weed.

After two days my moth had not produced any eggs, and was very much the worse for wear, with badly frayed wings. It seemed useless to keep it to bash itself lifeless, and, deciding to let it go, I had in mind to settle a theory of a friend, that it could not direct its flight with a damaged antenna; also, I hoped to have the pleasure of watching it perform with its long proboscis.

Placing it on my hand, I held it close to a flower, then with a gentle vibration of its wings it rose from my palm, immediately unrolling its tongue, and with a queer feeling movement pushed the entire length into the flower head.

For more than a minute I was able to enjoy this wonderful sight as it moved from flower to flower, and then, as if it realised it really shouldn't be there in broad daylight, it suddenly sped high into the air, and disappeared over the rooftop.

B. J. Ham (1327).

AN APPRECIATION

Mrs Vonta Purden Hynes (686), the "Butterfly and Moth Lady" of Battle Creek, Mich. (see *Bulletin No. 92*, p. 200), has written to thank H. E. Hammond (423) for writing, and the Editor for publishing, the article "Ware Cannibals" in *Bulletin No. 114*, p. 56. She thinks that cannibalism may explain her somewhat poor results in rearing certain species. She had noticed " how viciously they fought with one another if two met on a stem. It was a 'fight to a finish', and no backing up on either part. Usually one drops off, or is knocked off!" [*The larvae she mentions, however*—Smerinthus ocellata *L.*, Cerura vinula *L.*, *and* Laothoë populi *L. bred from English eggs—are not usually cannibalistic in England if given enough food and space.—Ed.*]

KILLING BOTTLE FOR LEPIDOPTERA

I started collecting as a boy of 11 years old, over 25 years ago, having no acquaintance with any entomologists. My only guide was an abridged edition of Furneaux, obtained as a cheap edition from a local newspaper, and up to 18 months ago I have been a completely lone hand.

My first killing tin was charged with bruised laurel leaves. This I found effective, but, having to go quite a long way from home to find laurel bushes, it was rather inconvenient. I

then went on to cyanide. It was a quick killer but left a severe rigour, particularly in hot weather. By the time the rigour was past the specimens, particularly the carpets and other slim-bodied moths, had set and even if relaxed did not set well, having a tendency to spring.

Through the years I have tried benzene, chloroform, ether, ammonia, and many other killing fluids, but none, excepting perhaps ether, has given perfectly satisfactory results.

Becoming interested in the histology of lepidoptera, I purchased Peacock's *Elementary Microtechnique*, and in it he mentioned ethyl acetate as a good killer and fixer, " leaving the muscles well relaxed. " Here," I thought, " is just what was wanted," and, experimenting with it, I found that it left insects perfectly relaxed so that the wings and legs would stay in any position in which they were set without springing. However, with some species killing was slow.

I designed a killing bottle, consisting of a screw-top jar 4½ inches in diameter and 7 inches deep. Into the bottom of this was placed a layer of cotton wool about ¾ inch thick when packed down. Then on top of this a circle of thin card with a ⅝ inch hole at one edge. Into the hole was fitted a 1½ inch length of ⅝ inch diameter glass tubing going down through the cotton to the bottom. On top of the card and up to the level of the top of the tube plaster of Paris was poured and allowed to set.

For charging I used 5 cc. water, 5 cc. ethyl acetate and 3-4 cc. of ether. This was poured down the tube into the cotton pad and a circle of card fitted tightly on top of everything. This stops insects from getting down the tube and also prevents them being contaminated with the damp plaster.

Moths inserted in this killer drop almost instantly and can be left for long periods without mould forming, and, when set, legs, wings, antennae, etc., stay just where placed. The ether will require renewing from time to time, as it is very volatile; in fact I always take a small bottle with me on a field day. Water and ethyl acetate, however, will last for quite a long time and will need renewing perhaps only once or twice in a season. It is advisable to keep the bottle out of the hot sun when in the field, as dew is liable to form on the sides.

D. H. HEPPELL (1690).

P.S.—Since writing the above it has been brought to my notice that a similar type of killing bottle was described in an abstract from a publication of the Canadian Department of Agriculture in *Bulletin No. 105*, pp. 71-2 (September 1949). Having only become a member early in 1950, I was not aware of this, but this personal experience may still prove of some use to other collectors.

Surgical ether is difficult to obtain unless one has connections, but " technical ether," sometimes called " dimethyl ether," is quite suitable, and much cheaper. Any chemist will supply it to responsible persons.

●

IMMIGRANT INSECTS:

Schedules of Daily Observations required

The appeal for new observers made in November 1948 (*AES Bulletin No. 95*) resulted in many offers, including some in vice-counties (such as those in Yorkshire) which helped to show where migrations ended in 1949; but the Insect Immigration Committee still lack daily schedules from more than half the English vice-counties. Members residing in the following districts are asked to volunteer to fill the gaps in the following vice-counties: Cornwall E., Devon N., Somerset N., Dorset, Sussex W., Herts, Middlesex, Oxford, Suffolk E. & W., Norfolk E. & W., Cambridge, Bedford, Northampton, Gloucester E., Monmouth, Hereford, Worcester, Lincoln N. & S., Nottingham, Cheshire, Lancashire S., Mid & N., Durham, Northumberland, Cheviot, Westmorland and Cumberland. In the 12 Welsh vice-counties the only 1949 schedules kept were in Glamorgan, Pembroke, Caernarvon and Flint. The forty vice-counties of Scotland only sent in schedules from Fife, Caithness and Shetland. Similarly the forty vice-counties of Ireland only produced two —from Co. Cork and Co. Dublin. Diligent observers in such key positions as Scalloway in the north, Timoleague in the west and Bradwell-on-Sea in the east show that there is merely lack of recording and not lack of interesting insects between these extremes.

T. DANNREUTHER (60).

Note:—Volunteers should send their offers to help direct to Captain T. Dannreuther, R.N., Windycroft, Hastings, Sussex, *who will send them full details, schedules, etc.—Ed.*

REPORT OF THE AES FIELD MEETING HELD AT CANVEY ISLAND, ESSEX, ON MAY 7th 1950

Leaders: C. B. PRATT and S. M. HANSON.

Owing to the large attendance at this field meeting it was decided to split the party into two groups to facilitate working the area. One party went straight on to the Island, the other kept to the Benfleet side of the East Haven Creek.

From the lepidopterist's point of view, the number of species whose larvae were observed came up to expectation. These included: *Lasiocampa quercus*, *Gastropacha quercifolia*, *Philudoria potatoria*, *Malacosoma neustria*, *Arctia villica* (fully fed and about to pupate), *Arctia caja*, *Euproctis chrysorrhoea* (much scarcer than previous years, probably due to recent spraying with insecticides), *Nola cucullatella*, *Allophyes oxyacanthae*, *Euchloris smaragdaria*, and *Cheimatobia brumata*.

Our Treasurer, Mr P. C. Le Masurier, brought a virgin female *Saturnia pavonia* along to the meeting and gave a demonstration of assembling.

Coleopterists were not without good fortune, for a specimen of *Emus hirtus* was taken. This is a local Staphylinid occasionally found in the Thames Estuary area.

Lastly, two shield-bugs were recorded during the meeting on the Island, *Syromastes rhombea* and *Podops inuncta*.

Both parties returned to the Hoy Inn, Benfleet, for tea, after which leaders gave a résumé of the day's observations.

S. M. HANSON (320).

IMMIGRANT RECORDS

CMDR. G. W. HARPER (1168), reporting from Rustington, Sussex, says that generally it has been a poor year for *Lepidoptera* though a good autumn for migrants, except the Clouded Yellow (*Colias crocea*). His son (1553*) has taken numbers of the Convolvulus Hawk Moth (*Herse convolvuli*), the Gem (*Nycterosea obstipata*), Vine's Rustic (*Caradrina ambigua*), a few Delicate Wainscots (*Leucania vitellina*) and White-point Wainscots (*L. albipuncta*) and a superb male Scarce Bordered Straw (*Heliothis armigera*).

W. J. MCCORMICK (1736), writing from Ilfracombe, N. Devon, says that the Hummingbird Hawk Moth (*Macroglossum stellatarum*) has been quite common there. Only two or three Painted Ladies (*Vanessa cardui*) and Clouded Yellow (*Colias crocea*) and two Convolvulus Hawk Moths (*Herse convolvuli*) have been taken. He took a Striped Hawk (*Celerio livornica*) at Braunton last year.

CAPTAIN T. DANNREUTHER (60) up to October 2nd, 1950, had had 56 larvae and 8 adults of the Death's-Head Hawk Moth (*Acherontia atropos*) reported to him. *H. convolvuli* had risen to 135 and *M. stellatarum* at 329 is high but not exceptional. Major G. S. Ralston of 12B Broadwater Down, Tunbridge Wells, had reported that he had seen a swarm of 70 *V. cardui* flying S.W. over the Downs, between Lewes and Brighton in 3¼ hours on Sept. 23rd, 1950. This was, "perhaps, a prelude to emigration in a 'below average' migration season".

D. WADE (1104) of Hull thinks that the Death's-Head Hawk Moth has been fairly common this year in Yorkshire, both as larva and moth. Two specimens of the Convolvulus Hawk Moth were taken in Hull in the middle of September 1950 and he himself took larvae of the Hummingbird Hawk Moth at Spurn Point during the third week of August.

B. E. DICKER (1811*) of Iford, Bournemouth, Hants, has a female *H. convolvuli*, found locally on October 2nd, 1950, and had a larva of *convolvuli* brought to him on October 8th which has pupated.

MILKWEED AT ROYSTON?

During the third week of August 1950 a Monarch or Milkweed Butterfly (*Danaus menippe* Hb.) was seen. Unfortunately it was not expertly observed, but description tallied and an illustration was immediately recognised by Mr Rayner who saw it.

CECIL H. ISON (1343).

DEATH'S-HEADS GALORE

On reading reports in the November *Bulletin* of Death's Head Hawk Moth (*Acherontia atropos*) larvae being found I felt that my own findings of this species during the last few months might be of interest.

On 18th August 1950 I came across a nearly full fed larva of *atropos* in a fair-sized potato field near Bury St. Edmund's, Suffolk, and naturally my bug-hunting instincts rose to bursting point. I felt that there must certainly be more larvae feeding in the field, so decided to carry out a row-by-row search.

Working at the week-end and during a few evenings, I at last finished the plot with a bag of no less than 42 larvae, most of them being full-fed.

The first larva went down on 21st August and all were down by 2nd September. A further 5 larvae and 4 pupae were brought to me on 5th September, bringing the total to 51. These latter had all been found in a potato field about 1 mile from the scene of my captures.

I placed the breeding cages containing the pupae in an airing cupboard on 18th September 1950 and between that date and the time of writing (November 7th) 42 moths have emerged, 9 of the larvae having died during pupation. All but 2 of the imagines were perfect.

Again, on 22nd September, I captured a perfect male Convolvulus Hawk Moth (*Herse convolvuli*) when it flew into our kitchen during the evening. It seems probable that the insect had bred in the district as the wings still seemed quite limp at the time of capture. I also took a female Whitepoint Moth (*Leucania albipuncta*) at sugar on a post in my garden on 9th September 1950. This insect was also in quite good condition.

RAFE F. ELEY (1201).

(*Our member's painstaking enthusiasm was well rewarded. One might justifiably ask here, " Is this a record?"—Ed.*)

P. J. GENT (192) says that the reports of the Death's Head Hawk (*Acherontia atropos*) in *Bulletin No. 119* confirm his opinion that 1950 has been a Death's Head year, even if migrations of other species have been poor. Seven larvae were identifiel locally in Northamptonshire, other reports of 'large' caterpillars were in circulation but not checked.

K. G. BLAIR (197) agrees with the suggestion (*Bulletin No. 119*, p. 97) that 1950 was a good year for Hawk Moths.

His own entirely local experience (Freshwater Bay, I. of W.) bears this out as he had records of all our species except *nerii*, *livornica*, *euphorbiae* and *galii* (the Oleander, Striped, Spurge and Bedstraw Hawk moths). Of these, the first two have been recorded from other parts of the country. The two Bee-Hawks were not actually from Freshwater but from about 4 miles away. He has never had such an experience in over 50 years' collecting. "Yet generally speaking," he continues, "it has been a poor year with many of the usually common species extraordinarily scarce and many species that usually put in an appearance completely absent."

JOHN MOORE (146) writes:—" A Death's Head Hawk Moth caterpillar was found by a child among potatoes at Kinsham, Worcestershire, on the 8th October 1950 and duly went to earth; but as the inquisitive child dug it up every day ' to have a look ' (before I could rescue it from this treatment) I think it unlikely that a moth will emerge from the pupa!"

L. B. HORNER (917) writes that since his report in the *AES Bulletin No. 119*, p. 96, eight more Death's Head Hawks have been found in the Guisborough area and several more about 8 miles away, in the Middlesbrough district. He was given, at the end of October (1950), an imago of *atropos* by a young man who found the large green larva on the roadside near a potato field early in September. " When he got home that night he put it into a two-pound jam jar with a piece of bread of all things " —but " *believe it or not*," the larva pupated and emerged about the middle of October, with the wings only slightly deformed.

NOTES AND OBSERVATIONS

J. H. JOHNSON (1040) writes:— " On September 8th, 1950, I walked across a piece of waste land a few hundred yards south of the Bull Ring in the centre of Birmingham at 2.30 in the afternoon. In five minutes I found 12 Garden Tiger (*Arctia caja*) larvae feeding on willowherb, 6 Broom Moth (*Ceramica pisi*) larvae feeding on ragwort, and 1 Buff Ermine (*Spilosoma lutea*) larva feeding on willowherb. Ten years ago this piece of ground was covered with shops. The moths have not been slow in colonizing it."

CASTOR HANGLANDS

In the October *Bulletin No. 118*, it was mentioned that the late W. T. Mellowes (302) helped to get Castor Hanglands (misprinted Hoaglands), near Peterborough, placed on the list of nature reserves.

It must, however, have grieved him to see it in its present condition.

When I visited it in June, it was a scene of devastation. In many areas all the large oaks had been felled, and branches and trunks were left strewn about. Paths had been churned up to stretches of mud twelve feet wide, with huge pools of water making them impassable on foot—presumably for removing the timber.

However, I know this was causing no little concern, and many local people, including some of our members, were doing their best, with the help of the Insect Preservation Committee, to stop the destruction. I sincerely hope they have succeeded.

Fortunately, the area to the West, away from the road, is as yet untouched, and I hope it will remain so, for it is a very good spot for entomologists.

I know the Insect Preservation Committee does very good work, but it does need money as Mr Syms said at the Annual General Meeting. For some time I have intended to send a donation, and the writing of this article has jogged my memory.

I have now sent my donation, not large, unfortunately, but if all members would send something, I am sure the Royal Entomological Society would put it to good use. What about it? The address is:—Insect Preservation Committee, c/o Royal Entomological Society of London, 41 Queen's Gate, London, S.W.7. So do it now, before you forget; maybe it will save other places going the way which Castor Hanglands has, in part, gone.

A. Showler (1442).

A CURIOUS SITE FOR AN ANTS' NEST

One day last August (1950), whilst walking across a field covered with ragwort, I saw what I took to be a lump of earth half way up a ragwort plant, and about a foot from the ground. Upon closer examination I found it was an ants' nest and there was also an ants' nest around the roots of the plant. The explanation I suppose is that the plant grew through the nest, but how was it that a part was fixed to the stem? Could it be that the ants decided to house a vital part of the nest above ground in case of flooding by our inclement summer? The piece I broke off contained only tunnels, but ants were passing up and down the stem, from one nest to the other, but I couldn't determine whether they were carrying anything or not. I'd like to think that Mrs Smith Ant had her home built higher up with a better view than the Jones Ant family down below. Class distinction in the ant world? Surely not possible seeing they are such intelligent creatures.

Alan P. Major (1117).

[The Editor would suggest that the Social Hymenoptera have brought class distinctions to a high pitch, but as there is full employment (and no money) each individual is content to do his or her job with the best endeavour; as obviously the usual *human* failings do not exist in these communities.]

THE LAST STAGE IN THE METAMORPHOSIS OF AN ELATERID

In September (1950) I was fortunate enough to watch the emergence and attainment of colour in a large Elaterid beetle (I think *Melanotus rufipes*).

I found the pupa in a cell with its cast larval skin in a rotten tree trunk on Mickleham Downs, near Box Hill (I was staying at Juniper Hall Field Centre at the time). The trunk was on the edge of beech woodland—probably an old beech trunk. I kept the pupa in a tin in moist moss.

In a few days' time the eyes were deeply pigmented—black.

It was at about 4 p.m. on Monday, September 11th, that the imago started to emerge—the pupa split down the back and the beetle struggled free. It was at this stage pure white, the elytra being transparent.

After a short while the elytra parted slightly, allowing the wings to expand.

At about 5.30 p.m. some colourless liquid was excreted—probably waste products which had accumulated whilst in the pupal state. Slight darkening was noticeable on the elytra at 9.30 p.m.—possibly the main veins of the wings beneath.

At 7 a.m. on the following day the thorax and head were tinged with light brown, and the wing veins, still visible through the very slightly-coloured elytra, were black.

By the afternoon the beetle had generally darkened, and there was no very obvious change in this reddish-brown until the end of the week. On

Saturday, 16th, the dorsal surface was much darker, but the ventral surface and the legs were still reddish-brown. On Sunday the head and thorax were almost blackish and the elytra very much darker, the wing veins now being obscured.

On Monday, 18th, the head, thorax and left elytron were black, but the right elytron was black only in a number of regions, the rest still being dark reddish-brown (see Fig. 1).

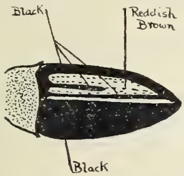

Fig. 1.

The ventral surface remained, as the legs, reddish-brown.

The beetle was 19 mm. long, with the thorax densely pitted, and with longitudinal rows of pits on the elytra.

Peter F. Prevett (1802*).

RELATIVE ABUNDANCE OF MOTHS AT A LIGHT-TRAP

A light-trap kept going in one's garden fairly regularly is apt to provide some surprises regarding the relative abundance of different species of moths. It would obviously be a good thing to make an accurate count every morning, and to record it in the form of a graph, and this will be one of my new New Year's resolutions—last summer I only kept notes. These show, however, that the commonest species which came to light in June was the White Ermine (*Spilosoma menthastri*); in July the Shuttle-Shaped Dart (*Agrotis puta*); in August the Flounced Rustic (*Luperina testacea*); and in October the Beaded Chestnut (*Agrochola lychnidis*)—the latter topped all the rest with scores of 30 and 40 on every favourable night, enormously variable.

Apart from *menthastri* I should not have thought these species to be extremely abundant in my garden; and only a light trap could have proved it to me.

I was surprised also by the number of Poplar Hawks (*Laothoë populi*) which came to the trap in late May; and by the occasional visits of the Silver Cloud (*Xylomyges conspicillaris*)—previously recorded—and of the Chocolate Tip (*Clostera curtula*) which I had not found in the immediate neighbourhood before.

I notice that the woodlice have a field day whenever I turn out the debris at the bottom of the trap, and I have seen them carrying away large crane-flies. I know nothing about these curious crustaceans but I suppose they are carnivorous and apparently they have no objection to their meal being impregnated with tetrachlorethane!

John Moore (146).

SCENT SCALES

The investigation of the Androconia scales of male butterflies has been occupying C. H. Ison (1343) during the past months. Thirteen British species have so far been dealt with, and Mr Ison would like to hear from any members who are interested, or who have done any work on this subject, with a view to collating the data obtained.

Members who have any damaged male butterflies (pinned or unpinned) to spare for this investigation will be doing a service if they will send them to Mr C. H. Ison, 47 Orford Road, London, E.17.

Please keep all different species separate so that mixing of scales is prevented.

The following are *not* needed:—Wall, Meadow Brown, Large Skipper, Marbled White, Silver Washed, and Heath Fritillaries, Large and Small White, Green Veined White, Orange Tip, Chalk Hill Blue, Common Blue.

PUBLICATIONS RECEIVED

Tropical Fishes by M. G. Elwin, WATER LIFE, Dorset House, Stamford Street, London, S.E.1. Price 1/6, by post 1/8.

This is the fourth edition, revised by the author, with new material, more up-to-date information, following the re-importation of species not seen in this country for a number of years, and a wealth of illustrations. The book forms an excellent introduction to this branch of the aquaria hobby.

Written by an expert who has had wide experience in keeping and breeding fish for a number of years, it gives valuable hints on making a start, selecting suitable tanks, choice of plants and general maintenance.

ON COMMON WING PATTERNS IN OTHERWISE DIVERGENT TROPICAL BUTTERFLIES

The article by David Hutchison is rather astonishing, for he "must admit surprise that so many well-known authorities appear to accept this hypothesis [of mimicry] without raising any objection to it." He has been born too late: if he were familiar with the literature of this subject he would find that his objections were raised, and met, many years ago. Moreover, they are very superficial.

(1) Birds, lizards, etc. (incidentally, what is meant by "etc."?) rarely devour butterflies. Even those who deny that birds eat butterflies to any considerable extent, admit that lizards do so. As regards birds, I have spent some years in amassing evidence of their attacks, direct and indirect. This is not the place for further discussion on this subject: I recommend Mr Hutchison to consult my communication to the *Proceedings of the Zoological Society of London*, 1941, Ser. A, Vol. 111 (one hundred and eleven), pp. 223-230, and 1937, Series A, Part 3, pp. 223-247: as regards lizards, *Proceedings of the Royal Entomological Society of London*, 1937, Series A, pp. 157-160.

It is true that birds are not *seen* to attack butterflies as often as Mr Hutchison thinks necessary, yet by the same type of argument I can claim that cars do not knock down pedestrians. I have never seen one do so, yet I am informed that such events *do* happen. No one claims that birds are especially fond of butterflies as food, only that they do eat them and that these attacks have selective value. Mr Hutchison may fairly be asked to state what he thinks *would* be enough attacks "to play an important rôle in the balance of nature." So great an authority as R. A. Fisher in 1930 (*The Genetical Theory of Natural Selection*) wrote of a 1% advantage that "it would require an enormous number of experimental animals, and extremely precise methods of experimentation, to demonstrate so small an effect experimentally. Such a selective advantage would, however, greatly modify the genetic constitution of the species . . . in 100 generations."

(2) "Butterflies are mainly kept in check, numerically, by a high mortality rate *in the early stages* of their metamorphosis," says Mr Hutchison.

It is not clear what this has to do with the production of mimicry by selection among *the adults*. The destruction that does matter is that of potentially breeding adults.

(3) There is a considerable number of unexplained exceptions: i.e., it is implied that A^1 cannot be a mimic of A because B and C are not.

Mimicry has been developed from variations in the past, and unless a species has varied in the appropriate direction it cannot be made into a mimic.

Incidentally, I do not know of any suggestion, by a student of mimicry, that *Melanargia* resembles *Pieridae*. True, it has a white appearance, but the pattern is unlike that of a Pierid.

(4) As for the "alternative explanation," it was foreseen long ago by Darwin himself in the early days when mimicry was thought of as a rare and peculiar phenomenon. Let me quote that great master of the subject, E. B. Poulton, in his *Essays on Evolution*, 1908, Oxford, pp. 232-3, "the conclusion that emerges most clearly is the entire independence of zoological affinity exhibited by these resemblances," and one of the rare cases in which Darwin's insight into a biological problem did not lead him right was when he suggested that a former closer relationship may help us to a general understanding of the origin of mimicry. The hypothesis of likeness due to consanguinity is one of those explanations which will not bear investigation. An overwhelming objection is the production of a mimetic resemblance by widely different means. Even if we consider butterflies only, as Mr Hutchison unfortunately does, we find this phenomenon. The pigments in a mimic may be of completely different chemical composition from that of the model. Certain markings, aiding the conspicuousness of a model, may be in a different anatomical position in the mimic, while occupying approximately the same position in the picture presented by it.

How does the explanation by consanguinity apply to such a species as the African 'Swallow-tail,' *Papilio dardanus*, of which the mimetic females are of several appearances, completely differing from each other, *and from the non-mimetic male*, while mimicking species of two different genera of *Danaidae* and one Acraeid genus?

(5) Mimicry is confined to the tropics. This is not the case. Superabundance of individuals is certainly necessary for the production of true mimicry,

that is, Batesian or pseud-aposematic resemblance, on a large scale. It is, after all, a somewhat dangerous process: indeed Mr Hutchison remarks that if mimics greatly increased their numbers they would cancel their immunity by providing enemies with at least an even chance of palatable prey. The cry of 'Wolf' cannot be raised too often. Yet there are excellent mimics in England, though they must be sought chiefly outside the Lepidoptera.

(6) There are, of course, examples of superficial likeness between insects far removed geographically from each other. Yet these resemblances are generally lacking in perfection of detail. I will present Mr Hutchison with an example which is very striking indeed. The dark wings of the 'Camberwell Beauty,' with yellowish margin, are shown also by an Oriental species of the Nymphaline genus *Cathosia* and the general likeness is amazing. It is not the type of coloration usual among *Cathosia*, and the underside of the wings is quite different from the upper.

It must be remembered that a mimetic appearance, especially among non-lepidopterous insects, is accompanied very often by modified habits and attitudes. The pretence to sting, or at least threaten, by *Sesia apiformis* is very deceiving: the movements of the beetle *Clytus arietis* are so wasp-like that many people will not touch it. Unless it can be shown that similarly coloured insects in different parts of the world are also modified in other ways as in the two cases mentioned above, the argument has no force.

G. D. HALE CARPENTER.

THE THEORY OF MIMICRY

I was very interested in the article in the November *Bulletin* of the AES by David Hutchison (919) giving a criticism of the theory of mimicry. Although this is hardly the place to give a full account of the arguments for and against the theory (for a full discussion see Carpenter and Ford, 1943), I feel it is necessary to make some comment on Mr Hutchison's remarks, many of which are invalid. I will try to answer his points one by one, wherever possible in the order in which he made them.

(1) Bates formulated his theory of mimicry before the rediscovery of Mendel's work, and like all his contemporaries he believed in blending inheritance. However, with particulate inheritance (Mendelian inheritance) it has been shown (e.g., Fisher, 1930) that if an inherited character is at an advantage of as little as .001 over its alternative form it will spread in the population and replace the other form. That is to say, if such a character arose which concerned the likeness of a relatively edible butterfly to an inedible species, so that 1 specimen in 1000 escaped being killed because of its resemblance to the 'model', then that inherited character would inevitably replace its older non-mimetic counterpart. Very little predation is necessary to confer an advantage of this order of magnitude.

(2) Furthermore, random elimination, at any stage, however severe, will not affect natural selection. A mathematical example will illustrate this point. If two forms of a moth var. A and var. B are in the proportions 30A to 40B in one generation but with B at a 10% advantage over A, then, if each individual produces 1000 eggs, in the next generation we would expect 30,000A to 44,000B, if there is no diminution. However, if there is 99.9% random elimination of the larvae then in the next generation we will get 30A and 44B. In other words, the very high mortality of the larvae has no effect on the spread of form B.

Natural selection does not protect or further the continuation of the *species* as Mr Hutchison seems to think, but only operates by the differential elimination of *individuals*. This seemingly trivial point has far-reaching theoretical consequences, which put an entirely different light on evolution.

(3) As Mr Hutchison points out, there are many apparently inexplicable exceptions. However, if exceptions in themselves are grounds for rejecting an hypothesis, then every biological hypothesis, including the theory of organic evolution, must be rejected.

(4) The alternative explanation of the resemblances between different genera and even subphyla, namely that of the retention of ancestral pattern, is even more difficult to accept than the theory of mimicry. For not only is it hard to see why ancestral colours should be retained when structural characters have altered so readily, but in a very large number of examples the pigments forming similar patterns are chemically entirely different. Moreover, resemblances

are confined to visible parts of the body and may involve structural and behavioural abnormalities in the mimic as for example the resemblances between some spiders of the family *Attidae* and ants (Myers and Salt, 1926). One further point is that in many species there is more than one mimetic form. *Papilio polytes* L. has three forms of the female, one non-mimetic *cyrus* Fabr., one *polytes*, which is an excellent mimic of *Papilio aristolochiae* Fabr., and the last *romulus* Cram., which is a mimic of *P. hector* L. Both these mimetic forms can't be accounted for on the 'ancestral' hypothesis. An even more striking example is *Papilio dardanus*, which has many mimetic forms. Moreover, not only does it copy many different species but also always the subspecies in whose area it is living. This correspondence cannot under any circumstance be attributed to the environment (because the differences are single gene differences in many cases) or to the retention of an ancestral pattern.

Finally, there are many examples of mimetic species in the temperate zone, e.g., the numerous species of Clearwing moth which resemble our best protected order of insects, the *Hymenoptera*, as do also the Bee-Hawk moths.

In conclusion, it may be stated that if the theory of mimicry is not accepted then the theory of warning colouration must also be rejected as well as much of the evidence for evolution. Those interested in this subject will find all the references they could need in Carpenter and Ford, 1943. It might also interest some members of the AES to gather data on the relative edibility of some of the British butterflies and day-flying moths particularly to see if those showing warning colouration are in fact less readily eaten than the cryptic forms.

REFERENCES.

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MIMICRY

The remarks by David Hutchison (919) on mimicry are very interesting, as the views he expresses are in direct conflict with those of well-known authorities on the subject.

I would, however, like to raise some points of criticism. First, one may ask whether the comparative brevity of the imaginal stage really does render it less liable to the attacks of predatory animals. My own experience when collecting in Europe is that many butterflies are, in fact, attacked and eaten by birds.

Second, Mr Hutchison suggests the argument that if mimicry is a *fait accompli*, its usefulness has been achieved, and birds, etc., no longer attack the adult butterflies, so that the mimics would increase so much as to cancel their immunity by giving their enemies at least an even chance of a palatable prey. This suggestion seems to take no account of the fact that many mimicking species would probably remain rare, owing to the activities of internal parasites or other enemies in the early stages. Therefore mimicry would not tend to cause the species to multiply to any great extent, but would definitely prevent extermination by animals preying on the adults.

Third, I feel that the developments in modern genetics lend support to the theory of natural selection. Much interesting work in this line has been done out in the field by such observers as Prof. G. D. Hale Carpenter, lately of the Hope Department of Entomology, Oxford, and by Dr E. B. Ford, to mention only two.

Again, with regard to the last instance cited by Mr Hutchison, that of the similarity between the Papilionid genus *Leptocircus* and the Riodinid genus *Zeonia* (certainly **not** *Ancyluris*), it is hard to see how these unrelated groups can have sprung from common ancestry. After all, the similarity is not so very great.

Lastly, it would be interesting to have an explanation from Mr Hutchison, by the theory of common environment, as to the similarity between quite a few *Lepidoptera* and insects of other orders, e.g., *Hymenoptera* and *Diptera*. Clearly the idea of common ancestry does not work very well here, and it is, incidentally, unnecessary to go beyond the British Isles to find examples of this latter type of mimicry.

H. D. SWAIN (1800).

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EDITED by TREVOR TROUGHT, M.A., F.R.E.S.

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BREEDING PSYCHIDAE

I have been breeding what I take to be *Fumea crassiorella* Bruand, and would like some more information to add to my own observations.

I first found a larva case, covered with longitudinal pieces of grass, low down on the trunk of a pine tree at Ferndown, Dorset. This was in June 1949. I was surprised, two or three weeks later, to find this case surrounded by a crowd of very active baby larvae, each one decently clothed in a case covered with minute specks of matter. These took readily to grass, preferring the flowers, and soon added small grass stems to their cases. In spite of some unavoidable neglect, a few of them fed up to a fair size before the winter, and after hibernating they again became active in the spring, feeding on grass flowers almost exclusively. They pupated on the muslin lid of the glass cylinder in which I kept them, the larva presumably turning itself round before pupation, as the head of the pupa case protruded, after emergence, from the end where the tail of the larva had been.

Four males emerged in May 1950, and then, some weeks later, a small batch of larvae emerged from one of the remaining cases. A female also emerged from another case, but remained clinging to the end of the case, and died there. Why did this female emerge from the case, and why did she lay no eggs? Fertilization is apparently unnecessary to this species. Also why did this female have a very long ovipositor, bent round underneath the body, and extending as far as the head? The eggs are apparently laid inside the larva case, if they are laid at all. Is the purpose of the ovipositor to lay them near the exit, to facilitate the emergence of the young larvae?

I found two similar larva cases, in May 1950, on sallow leaves in Alice Holt Wood, near Farnham. A male emerged from one, and a female from the other, this also remaining on the end of the case, and dying there. These cases have grass stems like the others. Had they fed on grass or sallow?

I encountered other problems about three years ago, when I found a larva case on a sallow leaf in July; I think near Petworth. The case appeared to be made of a leaf fragment, and I took it to be one of the *Coleophoridae*. (Where do the members of this family lay their eggs?) A large number of baby larvae emerged from the case, and I reared them successfully on sallow under a bell-shaped glass shade. After hibernation and a further period of activity and feeding, a good number of them glued themselves down to the glass for pupation, and I looked forward to their emergence. I was greatly disappointed to get nothing but a series of minute ichneumon flies. Now when could an ichneumon have stung all those larvae? It seems hardly likely that it could have been brought in on the food, unless as a pupa. Nor could it have got under the glass shade by itself. Nor do I see how it could have stung the ova before I had them, when these were not exposed to view at all. I should also like to know when the baby larvae make their cases, before or after emerging from their mother's case. I think it must be before, as I never saw a naked larva.

If anybody can throw light on any of my problems, I shall be duly grateful. E. Monica Gibson (311).

A REPETITION REQUIRED

Will the member who wrote to the Editor (? from Gloucestershire) about a Hummingbird Hawk Moth larva he had found and bred out, please write again, repeating the details and his question. The Editor regrets very much to have to confess that the original letter has been mislaid and eludes every search.

BRINDLED BEAUTY FEEDING ON PRIVET

I also found three or four larvae of *L. hirtaria* in North London when I was beating for larvae of *H. abruptaria* (the Waved Umber), having failed to find the imago earlier. (See *Bulletin No. 118*, Oct. 1950, p. 87.) G. V. Bull (160).

AN UNCOMMON GRASSHOPPER

On September 14th I was looking for grasshoppers at St Ives, Bingley, Yorks., in a marshy field, and I found a fully-winged female of *Chorthippus parallelus* Zetterstedt. The macropterous form of this species appears to be rare in Great Britain, as, according to M. Burr (1936) in his *British Grasshoppers and their Allies*, only one British specimen had been recorded at that time, and I should be interested to know if any more have been recorded since then.

T. B. Poole (1681).

THE COUNCIL FOR THE PROMOTION OF FIELD STUDIES

The fourth Annual Report of the Council, by the Director, Mr F. H. C. Butler, records the progress made in the year 1949/50. The number of students in the various centres has nearly reached its optimum—as distinct from its maximum—having regard to accommodation and staff. The up-to-the-minute reports from individual centres show that the number of " student-weeks " at the centres has been well maintained during the 1950 season.

Anxiety is expressed at the reversal in policy which a change in the system of grant aiding may bring about. The Centres are expected to be self-supporting not only domestically, but also in respect of their professional staff. The result is that the cost to the individual student making use of the facilities provided is increased. This increase will presumably be covered, in the case of students sponsored by an Education Authority, by an increased grant by the Authority. It is the private student—who is generally the advanced student and research worker —who is penalised. Surely, with threats of war, this is a time when " backroom boys " should be encouraged, even if they do work in the open?

An increase in the use of the Field Centres by university departments is noted. This needs expanding, to maintain a just balance. The time of the staff otherwise becomes too much occupied in elementary instruction to school and training college entrants who lack previous field experience.

The Programmes of Courses—which are usually of a week's duration—can be obtained from the Wardens of the four Field Centres. These are:—

Dale Fort Field Centre—Haverfordwest, Pembrokeshire.

Flatford Mill Field Centre—East Bergholt, near Colchester, Essex.

Juniper Hall Field Centre—Mickleham, near Dorking, Surrey.

Malham Tarn Field Centre—near Settle, Yorkshire.

Members are reminded that the AES is affiliated to the C.P.F.S., so when writing the AES membership number should be quoted. The present inclusive fee is 5½ guineas weekly (4 guineas at Skokholm Island). If a member wishes to study a particular natural history problem—ecological, entomological, etc.—he should write to the Warden of the Centre most suitable for his purpose. If he does not know which this is, information can be obtained from the Director and Secretary, C.P.F.S., at 10 Exhibition Road, London, S.W.7.

REVIEW

Stand and Stare by Walter C. Murray and L. Hugh Newman; pp. 104, 38 photographs. Published by Staples Press Ltd., London. Oct. 1950. Price 7/6.

The first chapter suffers somewhat from that all too familiar ' told to the children ' style. Unfortunately, we are not told who wrote the book, which I think is a pity. Presumably some of the chapters were written by one of the joint authors and some by the other. In any case, it was a relief to find that later on the style becomes straightforward.

The book is very readable by those who know little of natural history, and, moreover, attempts very successfully to acquaint such people with something more than the common elementary knowledge of the ways of plants and animals. The account of the dependence of orchids on a fungus for successful germination is a case in point; another example is the account of the mole, where personal experience is drawn upon to discount some oft-repeated and popular fallacies. This would be a good book to give one, young or old, who is beginning to take an interest in Nature and who wishes to know more.

The photographs are excellent, but I do decry the publishing of such pictures without acknowledgment to their authors. Presumably the book is intended for those who would not care who took the photographs, but, as one who himself tries to photograph living things, I resent being unable to give credit to the producers of some of the beautiful work here shown.

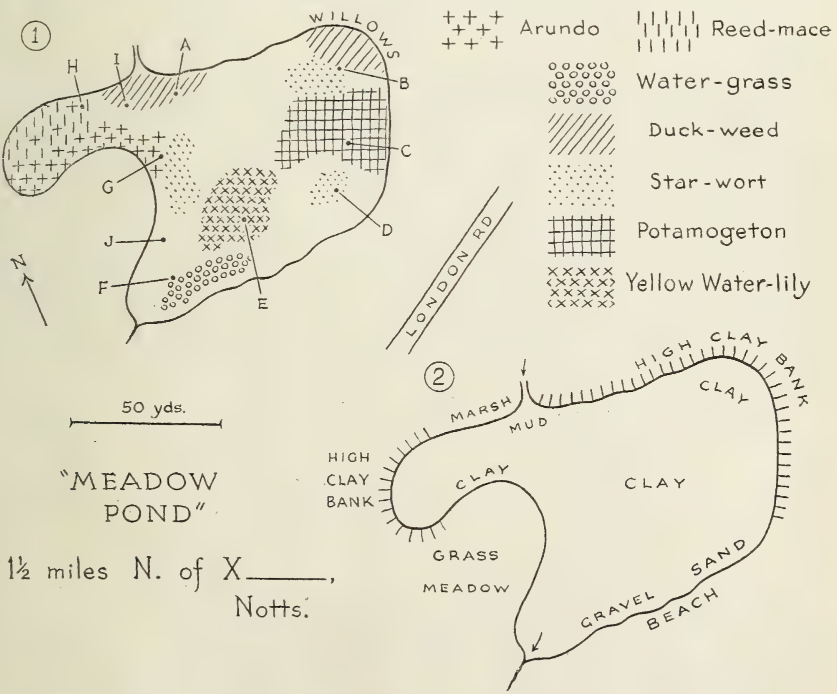
C. B. Pratt.

A SCHEME FOR GROUPWORK

Recent correspondence in the *Bulletin* has stressed the need for organized work of scientific importance by amateur entomologists rather than the amassing of larger and larger collections of British *Lepidoptera* and *Coleoptera*. With this view no one will quarrel. But surely J. H. Johnson's paragraph on Study-groups could far better have been replaced by a practical scheme of approach to some particular problem?

Ecological work is most surely that branch of biology to which the amateur can readily contribute and, more especially, if similar work is done elsewhere by other individuals. A scheme readily amenable to teamwork is set out below:

During the thirties various papers by Drs Macan and Walton were published on the subject of the water-bug population of ponds, lakes, ditches and streams in the United Kingdom. It soon became obvious that hardly any two ponds were alike in the comparative numbers and species of water-bugs present and it was noticed that the species that were dominant in one pond were often rare in another, almost identical-looking, pond. This plain statement of fact has possible explanations so numerous that it is only by amassing a good deal of data from all over the country that the solution can be found. Long papers by E. S. Brown, Macan, Popham, Walton, Walton and Pearce and others have appeared in the *Transactions* and *Journal* of the Society of British Entomologists as well as in the *Journal of Animal Ecology*, but repeated observations are called for: the scheme, as originally outlined by Walton, is very simple.



Equipment

The work requires no further equipment than a pair of gum-boots and a water-net. This latter must be stout and a foot or over in diameter; the usual commercial net with jointed-rod is of little use and invariably breaks. A bag of hessian (sacking) is far better than any of the fine quality fabrics usually sold for this purpose and a broom-handle is the best type of pole (and least expensive). Further accessories are unnecessary, but a pie-dish or waterproof sheet for tipping out the catch is useful. Organisms, when caught, are put in numbered bottles, specimen- or test-tubes, tins, etc. (not pill-boxes) and these

should be numbered at home beforehand. A label stuck on, and covered, by transparent cellophane tape is better than writing on the corks (which can get interchanged in the field) or with a " chinagraph " on the necks.

Preliminaries

A knowledge of all the species caught is not only not necessary, but, *there is no one who can identify, in the field, all the specimens likely to be caught.* As water-bugs are the commonest of all macroscopic animals in most aquatic habitats, as well as the objects of this study, these are our primary prey, but other animals are also taken as a check on habitat-type (and here the Pond-snails, Freshwater shrimps and Water Woodlouse are particularly useful).

Having selected our particular pond—and a small pond is best to start with—make a note of its name and exact locality (" so many miles North of ——, Notts."); a grid reference from the O.S. map in an added refinement. Next make a rough sketch-map, as large as possible, of the whole pond, and, leaving one's paraphernalia on the ground, walk round slowly and mark the plants of the pond and its banks on the map. Fig. 1 shows an imaginary sketch map; the scale is done by pacing-out, as drawn in the field. Select as many different places, within wading-distance, as seem to you to have distinct vegetation and different bottoms (clay, mud, chalk, sand, etc.). Fig. 2 shows the surface geology of our imaginary pond and this, also, should be plotted on your sketch-map (or a separate map drawn up). Mark the selected stations on the map as A, B, C, etc., and you are now ready to collect; most localities would require fewer stations than our imaginary pond. These preliminaries as outlined take only a few minutes for even a large pond.

Methods

Collecting should be done exactly at the pin-pointed stations, taking care not to collect at one place from two vegetation groups. The necessity for this will soon be apparent as the collector will find different animal populations at most stations. To collect, do two or three full sweeps of the net, being careful not to scoop up too much mud, and return to the bank. Note down on the map the approximate depth of water where the collection was made then sort out the catch into the numbered bottles. Draw up a table of tubes/stations—see Table I—and put all water-bugs and small beetles into one tube, larger beetles into a second, larvae and soft-bodied creatures into a third. This is to obviate damage to specimens—one should be wary, in particular, of Notonectid bugs (" Back-swimmers "), the larger carnivorous beetles (*Dytiscus* spp. and their larvae) and Dragon-fly nymphs. Other animals such as Shrimps, Snails, Leeches, etc., should also be kept. A spot of any killing fluid should be placed, preferably beforehand, in each tube.

TABLE I.

" Meadow Pond "—18th April 1950, 2-5 p.m. No sun, steady drizzle.

Station.	Tubes.	Notes.
A.	1, 2, 3.	
B.	4, 5.	4 Newt-tadpoles.
C.	6, 7.	3 *Dytiscus* larvae (in jar), 2 *Planorbis*.
D.	Nil.	
E.	8, 9, 10, 11.	Many leeches.

Hypothetical Field Tabulation of Results.

The procedure should then be repeated, with exactly the same number and length of sweeps, at all stations, even where the catch is nil. Any other details should then be noted, such as salinity of water (if near sea or salt-marshes), direction and strength of current, age of pond, if artificial, etc. Special techniques should be carried out for certain other insects. The small *Microvelia* can be taken on most ponds by collecting with the net used shrimping fashion just below the surface amidst Pond-weeds; surface dwellers such as Whirligig beetles, Pond-skaters, need an over-arm action—a search should be made for *Hydrometra* amongst vegetation close to the banks—*Salda* need searching for on clay or mud shores—the small *Hebrus* (*Naeogeus*) is usually found by taking handfuls of wet Sphagnum moss and wringing it out, the bugs coming out of the moss some few minutes later (this must be done on a waterproof sheet or beating tray).

After getting the catch home it can be mounted or wrapped up in screws of toilet paper; the only essential is that the various locality lots—A, B, etc.—should not be mixed. If you desire to mount the specimens see that *Corixidae* are gummed to card-points and not flat on to cards: the sexing and determination of this difficult family depends upon tarsal and underside characters. The entire work is nullified by wrong determination, but a considerable part of the catch can usually be identified with little previous experience—the writer will be glad to determine and return specimens sent. All data are then written up for publication.

Results

If the work is repeated every two or three months at the same pond very interesting results are obtained: the Water-bugs have two maxima in the year, late April and mid-September (with possible variants by a week or two). It is not unusual for 500 or more specimens, including twenty or so species, to be taken at these times.

The scheme as outlined may at first sight seem unduly complex but in actual practice it has been found possible to work some half-dozen or so ponds or streams in an afternoon. The writer has vivid memories of spending, last April, a day at Camber, along with E. S. Brown, when nearly twenty localities were worked in pouring rain.

D. Leston (1589).

ON COMMON WING PATTERNS IN OTHERWISE DIVERGENT TROPICAL BUTTERFLIES

I read Mr David Hutchison's article on this subject with interest, but must ask leave to disagree with his conclusions. He bases his argument on experiences in Tropical America; I can only speak for India and Burma, but I see no reason to believe that facts are different in the two continents.

Mr Hutchison made three points which I shall try to answer in turn.

1. He states that "birds, lizards, etc., although known to attack and devour the imagines, rarely do so, and not nearly sufficiently often to play an important rôle in the balance of nature." That birds attack butterflies has been proved by Professor Hale Carpenter, who has amassed so large a collection of specimens bearing beak-marks as to prove that these attacks are commoner than is generally supposed. My own observations in the East led me to believe that lizards are even more active predators on butterflies than birds, and kill large numbers of them. For example, I have found lizards haunting the patches of damp sand which attract such large congregations of butterflies. Other lizards rest motionless on foliage and snatch butterflies which settle near them. I still remember with vexation an occasion in South India when a lizard poached a Lycaenid butterfly which I was stalking, the species being either *Tajuria jehana* M. or *T. cippus longinus* F. The butterfly had settled and I was just about to strike when it vanished; and there, a foot away, was a lizard with the wings of my *Tajuria* projecting from either side of his mouth, and a nasty look of triumph in his eye. There is also a large species of lizard common in the dry parts of South India which can go purple in the face at will. I believe the purpose of this accomplishment is to attract insects to investigate what they imagine to be a flower.

Several genera of the *Lycaenidae* have an adaptation which gives them some measure of protection from lizards. The anal angle of the hindwing projects well beyond the tip of the abdomen, and the underside is furnished with convincing eye-spots and one or more fine tails resembling antennae. The simple lizard snaps at this supposed head, but the butterfly escapes none the worse except for the loss of an unessential portion of the wing. This adaptation appears to be extremely effective, to judge by the number of specimens which are caught with their tails bitten off.

No doubt others who have collected in the Tropics can provide more evidence of the toll of lizards on the butterfly population. The theory of mimicry certainly cannot be accepted unless it can be established that the butterfly is an important item in diet of lizards and birds.

Mr Hutchison adds under this head that the early stages are the most vulnerable in a butterfly's existence, and that the imago, with its short life and wings, can very well look after itself. Once more I must disagree. In the

first place, in tropical countries the development from the egg to the perfect insect is extraordinarily rapid, but I know of no evidence to show that tropical imagines are shorter-lived than those in this country. Secondly, even if the life of the imago is relatively short, there is no proof that it is therefore also safe, or that protective devices are not necessary. As any soldier knows, it is hard to conceal yourself when you are moving. The inert caterpillar may escape notice, but the active imago with its conspicuous wings is bound to attract notice. I cannot therefore agree that it is " least likely to succumb to the attacks of its enemies at this time."

2. The discussion of Mr Hutchison's first point has already encroached on his second point, namely, that " butterflies are mainly kept in check, numerically, by a high mortality rate *in the early stages* of their metamorphoses;" mimicry should therefore operate in the early stages. I am not qualified to say whether there are examples of mimicry in the larval or pupal stages, but if we accept that there is none, Mr Hutchison's argument is still unsound, because it is founded on analogy. He might as well argue that butterflies have no wings, because these are not apparent in the caterpillar.

3. Mr Hutchison's third point is (a) that because all butterflies do not mimic none can do so (!), and (b) that wing patterns are found which are common to unrelated species both of which are palatable, there being no known distasteful model. This second claim may be correct, and, as I do not know the foreign species to which he refers, I must assume that it is so; though I cannot accept the very slight resemblance of the Marbled White to the Pierids as an instance. I regard such a resemblance as fortuitous. In any case, it is a breach of logic to claim that, because the theory of mimicry cannot explain all resemblances, it can explain none. You might as well say that, because some men do not marry for love, no one can do so.

Mr Hutchison does not mention polymorphism. Why is it that certain species are found in a number of different forms, the distribution of each corresponding with that of an unpalatable species which it resembles? Many instances might be given, but one must suffice. *Chilasa clytia* L. is a widely-distributed butterfly which is found in two main forms, one of them resembling the *Danaidae* and the other resembling the *Euploeidae*. A form known as var. *janus* Fruh. is found in Burma, where the very similar *Euploea alcathoë* God. also flies, but is not found in India, where *alcathoë* is absent. The extreme instance of polymorphism is the African *Papilio dardanus*, where mimicry is confined virtually to the female sex. If this insect in all its many forms is " retaining the colours and patterns of the original ancestral form from which it sprang," this ancestor must have been a veritable Proteus.

Finally, " the pigment in mimics is often of completely different chemical constitution from that in the models . . . This disposes of the facile argument that the similarity in model and mimic may be due to consanguinity " (Hale Carpenter).

A. M. Emmet (1379).

FURTHER NOTES ON COMMON WING PATTERNS

In view of the criticism, not unexpected, of my article on common wing patterns in butterflies, I am prompted to enlarge upon some of the views expressed therein.

Firstly to dispose of the charge by Prof. Hale Carpenter that I " was born too late " (although this is really irrelevant and in any case beyond remedy), I did not pretend to have been the first exponent of a counter-argument to the Mimicry Theory, but I do maintain that when referred to in most textbooks, the subject is accepted without even a reference to the fact that objections have ever been raised.

I must also clear up any misunderstanding regarding my reference to the mortality rate among the larvae. The point I tried to bring forward was that resemblance between species should be more evident and commonly met with in the *larval stage* owing to continued attacks upon them whilst in this stage, as only the imagines springing from " avoided " larvae would propagate their kind and therefore, according to the theory, this would perpetuate convergent characteristics in the larvae as opposed to the perfect insects.

My comparison of *Melanargia* and several genera of *Pieridae* would appear to be disallowed on the grounds of difference in pattern. Also Mr Swain,

arguing along similar lines to Prof. Carpenter, points out that the similarity of *Leptocircus* to *Zeonia* (certainly not *Ancyluris*—my apologies!) is not so very great. On the other hand, I could quote numerous recognised examples of mimicry which tax the imagination much farther. The *Pierid* genus *Archonias* is said to mimic certain species of a large group of Aristolochia *Papilios*, but which species? They certainly possess a similar arrangement of colours but there is no specific resemblance. *Pereute* (*Pieridae*) is likened to *Heliconius melpomene* and certain *Actinote* (*Acraeidae*). The similarity here is indeed vague, to say nothing of the disparity in size and shape, which leads to a further point. The great difference in size between some "models" and their "mimics" appears to be glossed over by most authorities. An example of this is to be found in *Eueides aliphera* (*Heliconiinae*) and *Coloenis julia* (*Nymphalinae*), where the colouration and patterns agree but the respective sizes do not. Are we to believe that insectivorous animals possess a fine sense of colour discrimination but no sense of size? Surely the comparative sizes of species would be "amended" by any mimicry process.

It may be said that I am carefully excluding from the argument such cases of near perfection as *Melinaea imitata* and *Dismorphia praxinoë*, but what would mimicry theorists say if such equally perfect cases as *Araschnia levana-prorsa* (Palaearctic) and *Phyciodes atra* (Argentine) were found in the same habitat? *Phyciodes* would probably be considered to be "protected" in some way and *A. levana* described as an amazing case of two forms of a species corresponding with two different species of another genus, as *A. levana levana* matches species in another group of *Phyciodes*. *Catonephele orites* (America) and *Pantoporia orientalis* (East Indies), if found in the same localities, would conceivably be held up as a case of the male of one species, being totally different from the female, mimicking almost identically another species where the sexes are similar. I realise that the above comparisons are hypothetical in that the species concerned are geographically separated but I shall refer to these points in my argument below. Suffice it to point out that the species referred to immediately above are found under similar climatic conditions.

Before concluding, I should like to bring forward a specific case to show the extreme lengths to which adherents of the theory of mimicry were prepared to go in order to explain an awkward case. I refer to *Papilio antimachus*, a large African species resembling an Acraeid in markings. As no member of the latter group comes anywhere near *antimachus* in size and markings and as the theory was at stake, the day was saved by the prompt *invention* of a hypothetical giant species of *Acraea* (conveniently extinct) in order to provide the "mimic" with a "model." Entomology was thus confronted by a species which survived by "mimicking" a "protected" insect which itself failed to survive! This view is, I believe, still held by some entomologists, although it has largely been discarded. Perhaps some member could enlighten us regarding the current views on this species and whether a living Acraeid has since been found to provide a scapegoat for the wayward *Papilio*.

To recapitulate briefly the salient features of the foregoing, why have no striking mimetic resemblances developed among larvae? Why have the sizes of numerous insects under discussion never undergone modification? Why is it that we find species, inhabiting widely separated regions, exhibiting a striking similarity in pattern and colouration, a similarity proportional in perfection to the climatic and environmental similarity of the respective regions (see comparisons above), and, finally, why is it so difficult to believe that, following up the last-mentioned point, butterflies inhabiting a single region under precisely similar conditions would not exhibit further, commoner, and more striking similarities?

D. Hutchison (919).

AMENDMENTS TO THE CONSTITUTION AND BYELAWS OF THE SOCIETY

On March 25th, 1950, a Special General Meeting was held for the purpose of considering amendments to the rules of the AES Constitution and Byelaws. These were passed at the meeting, and have now been confirmed by postal vote of members. The three amended rules are printed below in full in accordance with Rule 9 of the Byelaws.

RULE 16: In Favour, 178; Against, 1.

Membership—All persons interested in Entomology shall be eligible for membership. Every candidate for membership must make application on the Society's official Application Form and such Application Form must be lodged with the Secretary. Acceptance of Members shall be at his discretion in the first instance. Where the Secretary does not see fit to accept a candidate, he shall lay the candidate's name before the Council, who sha.l have over-riding power to decide on acceptance or rejection.

ORDINARY MEMBERS, upon payment of the annual subscription fixed by the Council, shall be entitled to attend and vote at all meetings of the Society other than Council Meetings, to nominate candidates for the Council of the Society in the manner prescribed and shall themselves be eligible for such nomination. They shall also receive free of charge such of the Society's *Bulletins* or other publications as the Council may from time to time decide.

JUNIOR MEMBERS shall be members who have not attained the age of 18 by the 1st of January in each subscription year; the Annual Subscription being one half that of Ordinary Members. They shall enjoy the full rights of Ordinary Membership.

AFFILIATE MEMBERS shall consist of school groups and kindred juvenile societies, which upon payment of the ordinary Annual Subscription shall receive the privileges of Ordinary Members, except that only one delegate from each Society shall have the right to vote at any Meeting.

LIFE MEMBERS are entitled to rights and privileges of Ordinary membership for life (unless removed under Byelaw 18), upon payment of an agreed sum to be decided by the Council from time to time, compounding for their annual subscriptions.

HONORARY MEMBERS shall be elected by the Council in recognition of services to the Science and/or the Society. They shall enjoy the rights and privileges of ordinary membership without payment of subscription. Not more than two Honorary Members may be elected in any one year.

RULE 17: In Favour, 176; Against, 3.

Subscription—The Annual Subscription shall be payable on the 1st day of January in each year by all Members. The Ordinary subscription shall be 10/- per annum, or such other sum as may be decided from time to time by the Council.

The subscription of Members joining after August 31st shall cover the period from the time of joining to the end of the following year. Any such Members attaining the age of 18 years by the 1st day of January following the date of joining, shall pay the full Ordinary Member's subscription for the period. All other subscriptions cover one calendar year only.

RULE 29: In Favour, 176; Against, 1.

Editor—The Council may appoint any member of the Society as Editor to superintend and edit all Papers and Publications issued or published by the Society and to advise the Society generally on all literature appertaining to Entomology. He, or any Publication Committee that may be appointed, shall decide on the choice of manuscripts to be published.

The Editor shall not be subject to retirement under Byelaw 10, but the Council may at any time that they think fit terminate such appointment and appoint another Member as Editor.

Members will see that the total number of votes cast for or against each rule bears little relationship to the membership of the Society. This is due to the unfortunate fact that so many members failed to return their voting form.

Copies of the *Constitution and Byelaws of the Society* (*Pamphlet No. 3*), incorporating the above amended rules, have now been printed and are available from the Hon. Secretary, 167 Gunnersbury Park, London, W.5, at 4d per copy.

S. M. HANSON, Hon. Secretary.

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AES NOTICE
WHERE TO WRITE

Articles, drawings, etc., for all AES publications to: TREVOR TROUGHT, *Brookland, Tysoe, Warwickshire.*

Non-arrival of Bulletins *should be reported to* E. LEWIS, *8 Parry Road, London S.E.25, with correct postal address.*

Exchange Notices and advertisements to: E. LEWIS, *8 Parry Road, London S.E.25. (To reach him by 15th February, April, June and September.) Also requests for literature for prospective members.*

Notice of change of address to: B. J. BYERLEY, *48 Elmgrove Road, Harrow, Middlesex.*

Subscriptions to: P. C. LE MASURIER, *85 Warren Drive, Tolworth, Surrey.*

Membership:—10/- per annum. Junior Members, 5/- p.a.

Offers to lead field meetings, exhibit, etc., to: D. P. GOLDING, *517 Foots Cray Road, New Eltham, London S.E.9.*

Silkmoth Rearer's Handbook. *Data for the revised issue to*: W. J. B. CROTCH, *5b Stanley Crescent, London W.11.*

Applications for new membership to: S. M. HANSON, *167 Gunnersbury Park, London W.5. Also offers of help with AES work, and suggestions for improvements in our organization.*

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A E S

No. 123

BULLETIN

MARCH 1951

EDITORIAL

We are greatly favoured in this *Bulletin* with a description by Mr Kenneth Chapman of the many-sided aspects of the entomological exhibits and demonstrations to be shown in the Festival of Britain Exhibitions. It is obvious that much thought, care, ingenuity, and imagination have gone to the planning and carrying out of the designs. There is simply no doubt that we *must* go and see them. Our enjoyment will be so much the greater if we have that proprietorial interest, however slight. of having been " in on it." And we amateurs can help; even if our own personal contribution is small, there are so many of us that the sum could be considerable.

One of our members, L. Hugh Newman (503), has the job of supplying living material for the 'Country' Pavilion. He has bought and fitted a caravan, specially for this important mission, to enable him to tour the countryside to obtain this material. He wants many sorts of living insects (see the inside page of cover). Write to him if you can help.

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ENTOMOLOGY IN THE FESTIVAL OF BRITAIN

By Kenneth Chapman, M.A.,
Science Department, Festival of Britain Office.

Entomology, like the other branches of Zoology, occupies an important position in those sections of the Festival of Britain exhibitions which display aspects of the biological sciences. As in the case of all other sciences, no special section is devoted to Entomology alone, but insects are dealt with among other subjects in several sections, of which the most important are the " Living World " and " Land " sections of the Dome of Discovery, and the " Country " Pavilion. In the Exhibition of Science at South Kensington, studies of insect senses, particularly vision, and methods of balance and navigation in insects find an important place.

British insects are most fully referred to in the "Natural Scene" which leads into the "Country" Pavilion. This conveys an idea of the immense variety of fauna and flora as well as of scenery and underlying geological formations in the comparatively small area of the British Isles. Twelve areas have been carefully selected, ranging from St Kilda in the extreme North-west to the North Downs in the South-east. From these areas, a selection of plants, birds, mammals, insects, molluscs, etc., has been made to represent the varying populations of living organisms, including not only some of the " local " ones but also those of wider occurrence and more general range. In these " scenes " insects of many groups — Lepidoptera, Coleoptera, Hymenoptera, Diptera, Orthoptera, etc.—find their rightful and proportionate places. Thus it is seen that on the bare face of St Kilda Island, blue- and green-bottle flies and ants occur and migrant Painted Ladies and Small Tortoiseshells live as far north as this island outpost. Wood wasps, wood ants, deer-flies and various ichneumonoids and cynipoids are seen in the Cairngorms item, together with the Scotch Argus, the Emperor, Northern Eggar and Fox moths and such other typical but smaller denizens of this northern country as the Rannoch Looper, Juniper Pug and the various small burnets and crambids. In addition, there are shown insects such as the Timberman (*Achantocilis aedilas*), and the sawfly (*Amauronematus abnormis*) which is restricted to the Cairngorm area. It should be emphasised that while the occasional rarity, such as the Cairngorm sawfly, is figured when it belongs to a comparatively uncollected group of insects and where the area in which it occurs, though restricted, can be indicated by a vague reference to an extensive region, reference to very rare and localised insects and plants (particularly in the case of such groups as butterflies and moths) has been carefully avoided unless these rarities are adequately protected (as in the

case of the Swallowtail butterfly). Insects figure largely in most of the areas of Britain selected for the "Natural Scene," but, in some cases, emphasis is on other groups owing to the necessity to choose a few species to represent the enormous variety of plants and animals of all groups. Thus, in the Northern Ireland item, reference is made to one or two of the moths of that area only, and, in the Lake District item, only to some of the characteristic craneflies of the Lakes. In many cases it will be realised that widespread species occur in many of the areas chosen, so that to show them for several areas would involve unnecessary duplication.

In one scene, butterflies and moths characteristic of the Craven limestone, such as the Antler Moth, are shown, and in another some of the butterflies and moths which may be seen on the coast of Pembrokeshire. A considerable number of insects represent the rich fauna of Dartmoor and the South Devon lanes and coast and among these are included the Great Green Grasshopper, several of the moorland moths such as the Oak Eggar, the characteristic Jersey Tiger Moth and the migrant Hummingbird Hawk Moth and several characteristic dragonflies and humble bees.

In the New Forest item we show many other insects, the Hornet, the Giant Wood Wasp (*Sirex gigas*), the Stag Beetle, butterflies such as the Purple Emperor, the Silver Washed and High Brown Fritillaries, the White Admiral and the Large Tortoiseshell, and such moths as the Leopard Moth, the Hornet Clearwing and the Pine Hawk Moth.

In an item representing the lower regions of the river Stour near Flatford, a number of characteristic aquatic insects will be seen alive in aquaria. These include the Whirligig Beetle, the Great Water Beetle, the Water Boatman, the Pondskater and the Water Scorpion. Here also will be seen the nymphs of several dragonflies, caddis flies and mayflies, together with several water spiders. In this item the Lepidoptera shown will include the Essex Skipper, the Essex Emerald, Goat Moth, Browntail and Ground Lackey.

The North Downs item includes some characteristic ants of chalk hill country together with such well-known butterflies as the Meadow Brown, Chalk Hill and Adonis Blues, Grayling and Marbled White, and also the Six-spot Burnet and Cinnabar moths.

A separate item in the "Natural Scene" is a display of living Lepidoptera. The more colourful butterflies and moths will be shown herein, but not associated with any special area.

In the Dome of Discovery, the "Living World" section is concerned with advances in biological discovery, mostly made by British scientists and naturalists along many lines. In several of these, insects find an important place. In the earlier historical part of this section a reproduction of the first American butterfly ever figured is shown.

Later on, studies in mimicry and its importance in throwing light on evolutionary questions are illustrated by examples of mimics among tropical Lepidoptera and other groups.

Another item in this section illustrates, by means of working models of grasshoppers and co-ordinated records of their songs, the fact that sound may be as important as visual characteristics in identifying a species and, in fact, may be more reliable in the field. For this item, three British species of *Chorthippus*, whose songs were recorded in the field last summer, are being used.

Another item concerned with grasshoppers and related insects shows how physiological and geographical factors intervene to influence distribution and evolution in insects. The particular characteristics of grasshopper locomotion are shown to affect the high proportion of non-flying species, which in French North Africa increase in numbers, as one travels from East to West. The consequent isolation of species in the high mountain valleys is shown to play its part in this.

There is also, in the Dome of Discovery, an exhibit illustrating the migration of insects to and from the British Isles, with reference mainly to butterflies, moths and dragonflies.

In the "Land" section of the Dome, the main entomological items are concerned with tropical insect pests, and the ecological and other studies which have made their control possible. Thus the tse-tse flies are dealt with and the story of the control of the Levuana moth in Fiji is told. Here also appear items on

the control of malaria mosquitoes, including the spraying of tree fungi with copper sulphate solution in Trinidad and the consequent reduction in the numbers of malaria mosquitoes which breed in these fungi.

In all these items concerned with Entomology, use is made of a wide variety of display and representational methods. Thus, in addition to real specimens—both living and dead—insect models made in several media are included which, in some cases, ' work ' in various ways.

An important characteristic of Entomology as it is dealt with in the biological sections of the Festival Exhibitions, is the stressing of the ecological approach to insect studies.

GROUP WORK

The Editor has received numerous suggestions for the formation of ' groups,' following Mr W. J. B. Crotch's article in *Bulletin No. 117* (Sept. 1950) and Mr J. H. Johnson's extension of the idea in *Bulletin No. 119* (Nov. 1950).

In this *Bulletin*, a note of caution is struck by Professor Balfour-Browne (p. 30). This is required. The group or team clearly must have an expert—whether amateur or professional—as a leader and members must be prepared to take trouble with their observations or experiments—no ' I think ' or ' maybe ' about them. Then, it seems obvious, ten members can find out more than one, in a given time, and all have an objective and collective interest in their hobby. The expert leader prevents waste of effort, repetition and sidetracking; can write up results for a scientific journal (with, of course, a popular article for the *Bulletin*), and decides, when one line has been followed to its end, what next is required.

It is not possible to include details of all suggestions in this *Bulletin*. Let members interested in any particular subject write to the Editor, who will pass on enquiries to the group- or potential group-leader.

The following suggestions have been received, additional to the suggestions by H. B. Sargent (1189) and D. Leston (1589) in the last *Bulletin No. 122*.

1. Silk Moth Group.
2. Insect Galls.
3. Time of Emergence from Pupae.
4. Larval Colours.
5. Distribution of certain *Lycaenidae* (the Blues).
6. Distribution of the Elephant Hawk.
7. Collection of observations on cannibal larvae.
8. *Orthoptera* (habits and distribution).

SILK MOTH GROUP

Dear Mr Editor,—You suggested to me that there should be a Silk Moth Group and, if there is sufficient support from the membership, I am prepared to offer myself as *rapporteur.* I think that there might in fact be two groups to provide for separate sets of studies.

For those who are not prepared to begin rearing exotic insects, there is quite a lot of work to be done on the only British member of the *Saturniidae*, our Emperor Moth, *Saturnia pavonia* Linn. For example, the fully grown larva has tubercles which are, broadly, either white, yellow or pink. The offspring of any one pairing may include two colours or all three. Caterpillars feeding in the wild do not appear to be in preponderating numbers white when they are feeding on white-flowered plants or pink when feeding on heather, although one would have suspected some survival value in this factor. The segregation of reared larvae in this stadium and subsequent pairings between like colours through two further generations should establish whether a genetically pure colour strain can be arrived at. This is eminently a subject for corporate effort and the sharing both of insects from different wild sources and of the colour-segregated pupae. An even more interesting study would be to see whether the spinning of double-ended abnormal cocoons is an inheritable behaviour-characteristic. Adaptability of cocoon colour could be the subject of elaborated and shared experiments. If a strain could be found that would take to privet, some new work could be done on double broods and the effects of day-length and temperature respectively upon diapause. These tasks might be for Group A which, I think, ought to feel able to extend its studies to other British cocoon-spinners outside the *Saturniidae*, if worthwhile problems occur to anyone.

Secondly, there is unlimited work to be done on World *Saturniidae*, particularly with the help of members in

America and Africa. I think Group B might aim initially at studying the "rearability" in this country of any species not figuring in Mr Newman's usual annual list. Ova received by air from friends abroad (they travel perfectly in goosequills sent in ordinary air letters) might be instantly shared in accordance with a pre-arranged scheme according to the availability of certain foodplants, e.g., fruit trees, non-deciduous oak, virginia creeper, acacia thorn, walnut. Full descriptive data should be noted and photographs and drawings made of new species for subsequent inclusion in the revised edition of *The Silk Moth Rearer's Handbook*.

Will you permit me a few words in that connection? Members will have seen references to the revised edition for some two years now. This is a task which could never be perfected; yet a good text could be produced for printing at reasonably short notice at any time. The reason why the new edition does not appear is that the AES Council feel it wise to produce a number of major *new* publications and see some return on our outlay for these, before we tie up a further large slice of the Publications Fund in re-issuing something which, after all, we have once given to the world. I need hardly say that I wholeheartedly share this view (which was formed under my presidency) unless we can obtain from some benevolent source or sources substantial money gifts to enable early issue of a considerably re-organized and re-written edition. Meantime all facts which Group B might contribute would accumulate for the enhancement of the text.

I hope to hear from members who would like to participate in either group or both. Stamped envelopes for my replies would be a welcome courtesy.

W. J. B. Crotch (1181).
5b Stanley Crescent,
London, W.11.

TIME OF EMERGENCE FROM PUPAE

With reference to an enquiry in *Bulletin No. 110* (pp. 15/16), L. S. Beaufoy (628) and other members interested may like to know that, since publication of a note by one of us (P. M.) suggesting research in connection with "Pupal Emergence Times" (*Bulletin No. 87*, p. 123) we have been collaborating in this work with a view to publication of our findings at intervals. A number of butterflies have already received attention and data regarding moths are also being collected. It is indeed a most fascinating and profitable field of research, and the results of our investigations promise to be both interesting and valuable.

In the near future we hope to publish some preliminary notes on some of the species studied to date.

Peter Michael (748).
Peter Bradley (1360).

[*The Editor suggests that members breeding batches of larvae can assist by noting times of emergence and sending the data to one of the above.*]

PROPOSED INSECT GALLS GROUP

Dear Mr Editor,—With reference to recent correspondence in the *AES Bulletin* regarding the proposed formation of groups for the study of various groups of insects and related problems, I should be very glad to hear from all AES members interested in Insect Galls and to act as the Convener or Secretary of an Insect Galls Group. Could you please publish a brief note to this effect in the *Bulletin*, asking members to write to me at the above address?

Also, could you please ask members with books on Insect Galls to sell to send me full particulars and prices, as I want to buy various books on the subject.

Stanley A. Manning (1774).
4 Patteson Road,
Norwich, Norfolk.

ABERRATION OF THE SILVER-STUDDED BLUE

L. W. Siggs (243), of 10 Repton Road, Orpington, Kent, in 1949 and 1950 took specimens of the Silver-studded Blue (*Plebejus argus*) in which the "studs" were absent or represented by one or two scales. The colony from which they were taken lives on chalk in north-west Kent and feeds on Bird's-foot Trefoil. The aberration appears to occur more frequently in the male than the female. Will any member who has similar specimens, let Mr Siggs have particulars of locality, year, sex, type of soil, foodplant and any other useful data?

HUMBLE BEE RECORDS

Since my last records in *Bulletin 116* (Aug. 1950, p. 70) I have recorded several more species of *Bombidae* in the Bradford district, but I must say that the number did not come up to my expectations, mainly due to the bad weather. The following species, however, were recorded:—

Bombus soroënsis Fabr.—Ilfracombe Humble Bee. Two queens captured May 10th and 12th on bilberry.

Bombus hortorum Linn.—Small Garden Humble Bee. Queens numerous from May 12th onwards. Workers and males common in July.

Bombus lapidarius Linn.—Stone Humble Bee. Three queens and one worker recorded from Bradford district. This species seems to be very scarce in Bradford despite the fact that it is generally regarded as being one of the commonest British Humble bees, and is not easily overlooked.

Psithyrus campestris Panzer.—One male recorded September 15th.

Psithyrus sylvestris Lepeletier.—Four-coloured Cuckoo Bee. One queen recorded September 22nd.

Species from Other Districts.

Bombus lapponicus Fabr.—Mountain Humble Bee. One queen from Brimham Rocks, near Pateley Bridge, Yorks., on June 11th.

Bombus ruderarius Mueller.—Red Shanked Carder Bee. One male picked off knapweed head on August 20th at Sidmouth, S. Devon.

Psithyrus rupestris Fabr. Two males picked off knapweed heads on August 20th at Sidmouth, S. Devon.

The English names above were taken from Sladen (1912), *The Humble Bee, its life history and how to domesticate it.* Unfortunately this book is out of print.

T. B. Poole (1681).

AMATEUR ENTOMOLOGY IN SWITZERLAND

Dear Mr Editor,

You were kind enough to let me know that there might be some readers of your *AES Bulletin* who would be interested to know how entomological studies are organized in Switzerland.

Well, I can say without making any compliments to your country that, based upon my experience, you are organized on a larger scale than we are here. Indeed, we have—beside studies in Universities—only one large private organization, the Swiss Entomological Society (*Société entomologique Suisse*) which includes the scientific work in the study of insect life done privately, and which publishes every year a considerable volume, the *Bulletin de la Societé Entomologique Suisse.* Beside this comprehensive society with several hundreds of members, there are half a dozen local entomological societies in Geneva, Lausanne, Berne, Basle, Zurich and St Gall. Generally, during the winter months, their members meet every fortnight, but only one of them, the Society of Basle, publishes a periodical with scientific articles, the *Vereins-Nachrichten des Entomologen Vereins Basel und Umgebung.*

The lack of a periodical for amateurs, especially for young ones, caused in 1947 a student in Burgdorf, Mr Adrian Lüthi, aged 17 years only, to publish regularly every month a roneoed bulletin, which soon reached 200 to 250 readers, and which now has joined with an Austrian periodical as the *Entomologisches Nachrichtblatt Österreichischer und Schweizer Entomologen.*

In 1946 we have founded, as you know, a special group of young boys and girls interested in the observation of migrating Lepidoptera, which soon grew, and now includes adult amateurs and specialists, particularly because already in 1946, July and August, we had the chance to observe and describe the sensational immigration of *Celerio livornica* (the Striped Hawk) throughout the country. All records are carefully noted and published in circulars which are sent every two months to all members free of charge, because young people generally don't dispose of much pocket-money.

I still remember very well the days from 15th to 20th of July 1946 when news came from different parts of our country that there had been seen, in the twilight, one, two or even three of these really rare moths sucking at flowers in gardens, in window-boxes, in the fields. Finally, the number of observed moths increased up to hundreds simultaneously. They have always been seen evening after evening, in the twilight. A little later

we heard that these moths had been seen or caught at midnight, in the morning, and even during the day; it was striking to notice that those at higher places were seen more during day hours in full sunlight. It was then rather difficult to estimate the number having crossed our country because the frontiers were still closed up; but nevertheless, we judged to have seen one of the largest migrations of *livornica* which had ever appeared in Europe.

To-day, we know through different publications, especially the comprehensive and careful description of Mrs Vera Muspratt of St Jean-de-Luz (south-west of France), which has been published in the *Revue française de Lépidoptérologie*, that the origin of this large swarm of insects has been in Spain from whence they flew to the north-east across the Pyrénees, through the south of France, across the Alps and through Switzerland, Austria and the south of Germany.

We observe every kind of migrating lepidoptera, but this species, *C. livornica*, and another one, the Painted Lady (*Vanessa cardui*), are the migrants the most paid attention to. In 1949 we also had the chance to observe a very large migration of *V. cardui*. The first sign of it was a telephone call by one of our best young observers in the morning of the 12th of June: "Did you see them already?" We were better organized in 1949 than three years before, and therefore a very good description of this flight of *V. cardui* could be given in our circulars, which grew unusually thick in these months. And we had the great satisfaction to hear by one of the best German observers of migration that our description was the best he ever had read about a migration.

We know that these observations of migrating butterflies and moths have been developed in your country, especially by Dr C. B. Williams, who has very much encouraged our work in Switzerland, and we are very thankful also to Captain Dannreuther, who is inexhaustible in giving us advice and suggestions. There is a great advantage for you to observe immigration because you live on an island and where you may see the butterflies coming in, in more or less large numbers as Mr Wilkinson described it for the Hummingbird Hawk (*M. stellatarum*) in 1947. We, on the other side, do not know exactly whether a species has immigrated or is permanent in a certain place, but in the future we hope to know the different migrating species as you do in your country.

The best method to get real proof of a butterfly's wandering from one place to another consists in marking these insects with certain signs to recognize them again if caught anywhere else. This method tried on birds has been successful, though great difficulties had to be conquered. You easily will understand that these difficulties will increase with such delicate animals as butterflies are. Nevertheless, entomologists, again and again, have tried to mark Lepidoptera to find them in other countries and to get a real proof of their migration. Only last year, in your country, the experiments of Mr Campbell have been successful. Indeed, he marked about 300 *V. cardui* on the Isle of Canna with blue spots, and half a dozen of these marked specimens have been recognized at about 100 to 120 miles south-east in Scotland. We, too, have begun with marking butterflies in 1947, but we never could find the traces of marked insects up to these days, till June 1950, when one of our members discovered an *A. urticae*, marked in Berne and found 70 miles east of Berne. We hope to have already next year members in North Africa marking *V. cardui* and will try to have members in Europe to watch them arriving here. We are thankful for any address of interested observers to help us in this work. Therefore, if among your readers there are such ones living, for instance, in North Africa, Malta, Cyprus or any other island in the Mediterranean, might they write to you if they would help us in these observations? The best way to discover the migration routes is to have a great number of observers in the countries which are crossed by these quick fliers during their migrations.

Sincerely yours,
(Dr) R. Loeliger.

Susenbergstrasse 20,
Zürich 44.

CORRECTION

In *Bulletin No. 121*, Jan. 1951, p. 3, Mr J. B. Ogden's house is at Cote Hill, Burnley Road, Halifax, Yorks; and not in Lymington as stated in error.

MIGRANT INSECTS AT LIGHT

CAPT. T. DANNREUTHER (60) writes, "Will you please put a note in the *Bulletin* asking recorders to add the *nature of light,* when reporting observations?" He notes that a carbon filament search-light beam proved very effective at St Leonards in July 1944, when the town was otherwise darkened. Ultra-violet medical-ray light has been shown to be better than incandescent bulbs or car headlights. Comparisons, however, are required between similar bulbs, when used with filters, to give 'daylight,' 'neutral tint grey' or 'yellow' (as used to sharpen outlines for colour blind effect), acetylene hurricane lamps with white sheets, clear-glass-protected candle lights, gas lights with coloured shades (as used for photograph developing), neon light strips with colour screens and so on.

So, although great detail is not required in reporting, would recorders mention when specially powerful lights are used—and the types separated, e.g., incandescent, mercury-vapour, carbon-arc, etc. In any colour trials from similar lumen lights, reports could be on similar lines to the report of A. H. Turner. who worked on the preferences shown by butterflies for particular coloured flowers. (*Journal of the Society for British Entomology,* Vol. 3, Pt. 4, 21st August 1950, p. 210.)

●

IN DEFENCE OF THE DECREPIT MOTORIST

Evolutionary Fallacies in Recent Articles: *"A Survival Factor" and "On Common Wing Patterns"*

Let the Editor first be congratulated on the inclusion of the two highly controversial articles in *Bulletins Nos. 118* and *119* (Oct. and Nov. 1950), on "A Survival Factor" and "On Common Wing Patterns," articles which have offered such admirable opportunity for the discussion of subjects so often bristling with popular misconceptions.

Mr Putnam's amusing paragraph on the selective advantage to a dragonfly strain of the ability to choose between wet and dry shining surfaces for oviposition (together with the Editorial comment) involves several such misunderstandings of the mechanisms of evolution.

In the first place, individuals (if any) which in fact distinguish between the two surfaces do not necessarily do so by reason of an *hereditary* factor; and if such ability were non-heritable it would have—by definition—no evolutionary significance.

In the second place, it is not established that *any* individuals do in fact so distinguish; possibly, indeed quite probably, any thoroughly ripe female of the appropriate species passing over a shining surface would oviposit; just as the chicken which crosses the road in front of the (alleged) aged motorist may be the one that is on the least interesting bit of grass rather than the one with a personal propensity for automobiological suicide.

Third, the proportion of chickens which cross the road is quite insignificant compared with the proportion which *never have the opportunity.* Therefore, even if there *is* any hereditary tendency to cross roads, its persistence through the generations in this large reservoir of unexposed individuals will swamp any elimination that does occur among the few that do haunt the roads. If indeed old (*sic*) motorists would agree that road-crossing chickens are much reduced in numbers, they would be guilty of an unscientific and unsupported assertion to which they as laymen might be entitled—but not the Editor of this periodical! And if such an assertion could in fact be substantiated it could more reasonably be attributed to increased wisdom in poultry-keepers than in their flocks.

The argument of the preceding paragraph applies, *mutatis mutandis,* to dragonflies—the proportion laying over shiny 'dry' surfaces is likely to be insignificant compared with the vast reservoir of those which do not happen to be near such a surface when the urge to lay comes upon them.

Fourthly, both article and comment largely miss the really prodigious slowness of evolution in the normal well-balanced community of living things. Huxley* shows that a simple dominant giving a selective advantage of 1 in 1,000 takes 5,000 generations to increase from 1 to 50 per cent. in the population and a further 12,000 to increase to 99 per cent. Clearly the later stages of elimination are the slowest and even Mr Putnam's cautious guess is too rash (even for

*Huxley, J. S. *1942. Evolution, the Modern Synthesis,* p. 56.

this comparatively favourable case—assuming ability to distinguish is a simple dominant). With all optimism, I cannot feel that the archives of the AES will exist as such in, say, the 70th century A.D.!

W. B. Broughton (1632).

THE WELL-SET MOTH

The Editor,
The AES Bulletin.

Dear Sir,

With reference to Mr A. L. H. Townsend's instructive article, "The Well-Set Moth," in *Bulletin No. 120* (December 1950) there are two points on which I should like to comment.

(1) Mr Townsend says, . . . "though it is often necessary to include a bad specimen in the collection."

This is obviously taking the view that a bad specimen is better than none at all; but this, I think, is rather a matter of personal opinion, as I know of other collectors besides myself who have a certain standard, and would not include an inferior insect in the collection, no matter how rare, or what extreme "var." it might be.

From the *purely scientific angle*, condition is doubtless not so important.

(2) Regarding the length of time for which butterflies and moths should be left on the boards, it is an excellent suggestion to leave them on for a definite period, but if one is rather limited for setting space, and it is desirable to clear the boards as soon as possible, it may be borne in mind that some of the larger moths, such as the 'Hawk Moths,' the Goat Moth (*Cossus cossus*), etc., especially if they are bred females full of ova, require an appreciably longer time for the bodies to get thoroughly dry than would, say, an average Geometer.

Personally, in this country, I like to leave the *average* specimen of butterfly or moth on the board for a month if possible, and three weeks as a minimum, depending on whether the boards are urgently required.

Incidentally, as I may have mentioned on a previous occasion, specimens transferred to a 'laurel jar' for 24 to 48 hours, after having been killed in cyanide, are then well relaxed for setting.

Yours faithfully,

George C. Holroyd (253).

(Note:—With regard to point 1, the Editor thinks "it all depends," and Mr Holroyd also has left a loophole. The maintenance of a high standard is most desirable; but one would not destroy (in Africa) a species new to Science, because it does not come up to standard—even in this country a damaged Oleander Hawk would probably find a special place in the collecton of anyone lucky enough to find one.—Ed.).

NORFOLK LEPIDOPTERA

Absence of the Lackey Moth—The Lackey Moth (*Malacosoma neustria*) has been totally absent from the Stoke Ferry area in 1950. As it is generally rather plentiful, I wonder if any other members have noticed any similar shortage of this moth in the larval stage last year?

Death's Head Hawk Moth—Caterpillars and pupae of the above moth were received by me as follows:—

29th August 1950—1 larva, 1 pupa. Taken at Methwold, Norfolk.

19th September 1950—1 larva, 1 pupa. Taken at Hilgay, Norfolk.

20th September 1950—1 larva, 2 pupae. Taken at Hilgay, Norfolk.

The caterpillar received on the 29th August pupated normally, the remaining two were received when the foliage on the potato fields in this (Stoke Ferry) area had died, after a severe attack of blight. It was therefore necessary to find a substitute food-plant. The caterpillars accepted the Tea-Tree (*Lycium barbarum*), although they were then in a very weak state, having been without food for at least 30 hours. They eventually pupated, but each produced a deformed pupa. (All the other pupae were forwarded to a friend; I am not yet aware whether he was successful in rearing them.)

Rearing out of Season—I have again experimented with rearing out of season. Hibernating caterpillars of the Wall Butterfly were brought into a warm living-room about mid-October, and placed in ordinary jam-jars covered with pieces cut from old silk stockings held in position by elastic bands. The temperatures in the room are about 60° F. from midnight to 9 a.m. and 75° for the rest of the day. They were fed each night with fresh cut grass, and grew very rapidly, so

that by the end of October all had turned to chrysalids. At the time of writing (14th November) 7 males and 3 females have emerged. On the 15th October 1950 I noticed a female Small Copper Butterfly ovipositing on sorrel. I obtained four eggs and placed them in a jam-jar, this time covered with a metal lid to keep the foodplant fresh for a longer period. Placed in a warm room, the larvae hatched and grew rapidly. Three pupated on the 12th November and one on the 13th November. One emerged on 23rd November and three on 25th November.

A number of the larvae of the Oak Eggar Moth (*Lasiocampa quercus*) reared from the egg, and in their first instar were also brought indoors and placed in jars covered by metal lids. This was in late August. Towards the end of September I changed their foodplant and gave them ivy, instead of sloe or hawthorn; as, in previous years, they got diarrhoea if sloe and hawthorn are continued after the leaves begin to decay, and I have frequently lost the whole brood. This year although I lost a few—about 5%—the caterpillars have continued to grow, rather slowly, but to magnificent specimens. I continued to rear them up to the last instar in jars, " thinning them out as they grew," until early October, when they were placed in a large glass-fronted wooden cage hastily constructed from a drawer from an old chest of drawers; feeding in the jars had become somewhat of a problem owing to the limited space and the appetites of the caterpillars. They are now doing fine and are commencing to spin up, five having already spun their cocoons (14th November 1950).

P.S.—By 4th December the larvae have spun up in two large clusters in the cage. When one larva had spun up other larvae found it easy to attach their own cocoons to it, and so the cluster grew.

Late Date for Meadow Brown—On the 26th October 1950 I saw near Abbey Station, West Dereham, a fresh-looking female specimen of the Meadow Brown butterfly. It was quite lively, the only signs of wear being a slight fraying at the edges of the wings. I saw a Small White and male Brimstone butterfly on the same day.

G. Victor Day (29).

A FURTHER NOTE ON THE SILVER CLOUD *(Xylomyges conspicillaris L.)*

John M. Moore (146), in his article on this moth, is apparently correct when he mentions elm as a possible foodplant (*Bull. 118*, Oct. 1950, p. 89), but it still has to be proved that the species feeds on tall elms or oaks.

I was with Dr Bernard Kettlewell (706) at Tring on October 15th 1950, and this moth was discussed. Dr Kettlewell informed me he has reared the species right through on elm. His method was to plant elm *suckers* in the garden, place a tea-chest over them and cover with gauze. He found them very easy to rear.

Elm suckers may, of course, be considered as " low plants," within the terms of Mr Blathwayt's (651) note in *Bull. No. 120* (Dec. 1950, p. 107), but in view of the fact that *conspicillaris* eats elm at all, I see no reason why it should not ascend trees to do so after dark, and return to ground level after feeding.

Mr Blathwayt bases his assumption that the species is a " low feeder " on the grounds that the larva immediately falls off the foodplant when disturbed. A great many larvae, especially those of the family *Agrotidae*, have this habit, and it is in no way a proof that such larvae are " low-feeding " species, or, at least, are *confined* to " low plants."

I would suggest that those members living in a *conspicillaris* locality may be able to settle this point by ringing a few elms with brown paper. The method is as follows:—

Entirely ring the tree with sheets of brown paper. Tie this tightly at the bottom and loosely at the top. Any larvae ascending the tree will pass over the paper, but on descending tend to pass under it and, being at once in near-darkness, will often remain there to rest, especially if the tree is in a cool and shady spot. It is advisable to examine the trap early in the morning before the heat of the day forces the larvae out.

Even if *conspicillaris* is not obtained, the paper may cover other desirable larvae and is well worth a trial in secluded spots.

H. E. Hammond (423).

AMATEURS AND TEAMWORK

In *Bulletin No. 117* (Sept. 1950) Mr W. J. B. Crotch contributed an article entitled " Where are we going?" and quoted Mr K. G. V. Smith, who had suggested that we would do well to organize " a panel of research advisers." In the November and December *Bulletins* there appeared two more articles by enthusiasts for teamwork. There have been many enthusiasts for this among amateurs, including myself, but only very rarely has anything resulted, except where a definite purpose has been defined, and then usually under the auspices of a trained biologist. One of the few I can remember was the recording of the British distribution of certain mosquitoes, organized in Scotland by the late Professor Ashworth and carried out with the assistance of amateurs, and in England, so far as I remember, by the South-Eastern Union of Scientific Societies under official guidance.

There is, however, a kind of teamwork which has not been mentioned. This is created by the specialist who, in order to obtain all the information possible concerning the distribution, habitat and time of occurrence of the species of his group, gets in touch with collectors all over the country and names for them their captures within his group, in exchange for particulars about the specimens. This kind of teamwork has certain advantages over that suggested in the articles referred to, in that it is organized by one individual with mutual advantage to himself and the other members of the team; it tends also to create other specialists who contribute more to scientific knowledge than does the general collector. Instead of lowering the status of the individual, as stated by Mr Johnson, it tends to raise him.

It is better to do a small thing well than to do a larger thing less well and I for one would have little faith in anyone who claimed a general knowledge of a large proportion of the insects met with during a summer season. If Mr Johnson's specialisation might lead him, as he suggests, to inability to name 999 out of every 1000 insects met with every summer I should certainly advise him not to specialise because his knowledge of insects would be too minute to enable him to select anything to specialise upon—but, speaking seriously, although his knowledge of his selected group would increase, he would not lose much that he already had of his general knowledge and he would acquire an interest in his group which would far exceed the interest available from the more superficial observations of much more material.

Let the enthusiasts endeavour to arrange panels and teamwork on the lines they suggest, but do not discourage anyone from specialising and developing the kind of teamwork I advocate here.

FRANK BALFOUR-BROWNE (340).

NOTES AND OBSERVATIONS

W. C. BENNETT (544) of Totnes, S. Devon, reports finding a mite infesting the bristles of ' pure bristle toothbrushes ' in mildew. Mr E. BROWNING, of the Natural History Museum, South Kensington, has identified this as a species of the genus *Glycyphagus*, one of the *Tyroglyphidae*. Numbers of these mites, he says, feed on fungi and are carried by flying insects—e.g. flies, etc.—and can also be blown about in the air.

P. G. LANGFORD (1630), writing from 7 London Road, Widley, Portsmouth, records feeding Emperor Moth (*Saturnia pavonia*) larvae on willow, after unsuccessfully trying them on bramble and other plants. He had eight eggs which hatched by May 16th, 1949, four larvae had pupated by July 20th and three emerged on March 20th (male), 29th (female), and April 3rd (male) 1950. The fourth pupa on 3.12.50 is still very much alive.

Also, on September 12th he was given a Hummingbird Hawk Moth (*Macroglossum stellatarum*) larva which lacked any lines along the sides, but was otherwise according to South. It pupated on September 14th and the pupa was remarkable in that it was almost entirely transparent, enabling him to observe the growth of the moth in the pupa. The moth which emerged on November 9th was a fine specimen; the hindwings had the dark border very much increased in width and the orange-yellow colour replaced by a small band of bronze.

R. D. HILLIARD (99) writes:— " When digging around poplars the pupa of *Laothoë populi* (The Poplar Hawk) is usually one of the commonest to turn up and I have al-

ways found it at the base of the tree. This year, however, I found one in a hole about four feet from the ground, the hole being filled with the dry debris thrown out by larvae of *Cossus cossus* (the Goat Moth). The presence of a further pupa at the roots of the tree seems to indicate that it was not the nature of the ground that influenced this unusual choice."

A COINCIDENCE?

I do not know if this is a coincidence or not, but when searching for pupae I generally discover that when I find two lying together, the resulting moths emerge at the same time and are of opposite sexes. Last Winter I unearthed three pupae of *Laothoë populi* (Poplar Hawk), all from under the same tree. Two of these were found almost side by side. The following Spring the imago from the odd pupa emerged on the 28th May and the pair, found together, both emerged on the 7th June and paired the same night. I also have found two Emperor Moth (*Saturnia pavonia*) cocoons. The two moths emerged at the same time, one male, one female. I believe Stratton Porter has a similar note in her book *Moths of the Limberlost.* I wonder if any other member has found this to occur?

M. F. Taylor (1725*).

[*It would be interesting to know whether other members have noticed this phenomenon. It is difficult to believe it is more than coincidence.—Ed.*]

DEATH'S HEAD HAWK MYSTERY

Can anyone offer an explanation for the death of a fresh-looking Death's Head Hawk Moth (*A. atropos*), which appeared to be newly emerged, and was brought to me on October 19th, 1950, having been found on its back in the road? I placed it in an airy cage, with the intention of showing it alive to friends next day, and kept it in the living-room, which remained at a temperature of about 70°. In the evening there was a sudden distressed squeaking noise. like a mouse trapped in the room, and I found the moth lying on its back convulsing its body as in a killing bottle, even ejecting some of the fluid remaining after emergence from the pupal stage before flight; within a matter of seconds it was quite dead.

I cannot think heat was the cause of the trouble as previously I had kept an *A. atropos* moth without bother, under similar conditions.

B. J. Ham (1327).

IMMIGRANT RECORDS

Milkweek Butterfly in Somerset

Mr J. G. Keylock, a former member of the AES, reports the capture of the Milkweed, or Monarch, butterfly (*Danaus menippus*) by a friend of his, at Crewkerne, Somerset, in early September 1950.

Vine's Rustic in Middlesex

J. P. C. Ward (1440*) records the taking of three specimens of this moth (*Caradrina antigua*); one male on a footbridge on Western Avenue, Perivale, on August 22nd. 1950, at the light of a mercury vapour lamp, and a male and a female at the flowers of the Ice-plant (*Mesembryanthemum*) in his garden at Southall, during September.

The Death's Head Hawk

W. C. Bennett (544) records three from the Totnes area of S. Devon, one feeding on the Tea-plant (*Lycium bartarum*) found by a schoolboy and two in potato fields.

The Convolvulus Hawk Moth

W. C. Bennett (544) also records two females, which were nearly dead when brought in and another, on October 16th, 1950. found on a door-post.

INSECT GALLS

Important and interesting additions to our knowledge of the lives of both plants and insects could be made by amateur entomologists throughout the country who are prepared to collect galls, try to rear their occupants, and go to the trouble of keeping dated records of their finds. In another part of this *Bulletin* those interested will find particulars of a proposed Insect Gall Group through which galls could be named and information recorded and obtained.

The best way of getting to know the commonest types of gall is to borrow all or any of the books listed below, study the illustrations, and then go out into the field and search carefully for galls.

E. T. Connold: *British Vegetable Galls.* 1901.
E. T. Connold: *British Oak Galls.* 1908.
E. T. Connold: *Plant Galls of Great Britain.* 1909.
E. W. Swanton: *British Plant Galls.* 1912.

Other important books and papers are listed in Mr Niblett's paper in the *Hymenopterist's Handbook* published by the AES. There are other reasons why this very useful paper should be read by all potential students and collectors of galls.

The amateur will soon find that there are countless insect galls besides the familiar " Robin's pin-cushion " on Wild Rose bushes and the " Oak apples " and " Marble galls " on Oak trees.

It is most important that he should write the name of the galled plant on the box or packet containing each gall collected. If this is not known a specimen of the plant (including flower whenever possible) should be sent to the Insect Gall Group or taken to a local museum for identification. Galls which bear exit holes and are obviously unoccupied can be stored in envelopes, paper packets or small boxes. Occupied galls can usually be kept under observation in jars or boxes with tight-fitting lids. I have reared many gall-causing insects in this way, though some of the Oak galls require special treatment.

There is no actual " close season " for the gall collector, as many galls can be found on plants and trees during the most severe winter. But the main work of searching and collecting starts in April.

The real secret of success in the work is to be content to search a small area of woodland, meadow, or other habitat thoroughly, turning over leaves, lifting branches, and so on. Little collecting equipment is required, and I have managed with a big and strong pocket knife, a trowel, a pencil, a notebook, and an assorted collection of small tins, boxes, bottles, jars and packets.

To give a rough idea of the scope of the work, I would mention that I have found about sixty-seven different galls on plants and trees on the Old Buckenham Hall Estate, East Norfolk, where I started a Survey of the Fauna and Flora of some one hundred acres of woodland, grassland, and marsh in January 1949. The insects responsible for these galls can be classified as under:—

Hymenoptera	34
Diptera	23
Homoptera	9
Lepidoptera	1

STANLEY A. MANNING (1774).

[*Note:—Members who are interested in Insect Galls should read the item on p. 24, where Mr Manning proposes the formation of an Insect Gall group. Mr Manning has also been appointed to the AES Advisory Panel to deal with queries on Insect Galls.—Ed.*]

AN OMISSION

The Editor regrets very much that Mr P. M. SHEPPARD'S (291) name was omitted at the end of his contribution called ' The Theory of Mimicry ' on page 7 of *Bulletin No. 121*, Jan. 1951.

ADVISORY PANEL

The following gentlemen have kindly agreed to serve on the AES Advisory Panel:—

Microscopy

J. ERIC MARSON (1390), 35 High Park Drive, Heaton, Bradford, Yorks.

Insect Galls

STANLEY A. MANNING (1774), 4 Patteson Road, Norwich, Norfolk.

Hymenoptera

Please delete the name of Captain D. B. Baker (p. 23 of the *AES Membership List*, Oct. 1949), who has resigned.

Members are reminded that they must enclose stamps for the return postage of specimens, or a stamped addressed envelope if a reply only is required.

Will members who have not yet paid their 1951 subscriptions please do so now.

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1951

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by TREVOR TROUGHT, M.A., F.R.E.S.

AES NOTICE
WHERE TO WRITE

Applications for new membership; offers to help with AES work; Exchange Notices to: E. LEWIS, *8 Parry Road, London, S.E.25. (Wants and Exchanges Lists are circulated in March, May, July and October and notices must be received by the 15th of the previous month.)*

Advertisers to: L. W. SIGGS, *10 Repton Road, Orpington, Kent.*

Non-arrival of Bulletins and changes of address should be reported to: B. J. BYERLEY, *48 Elmgrove Road, Harrow, Middlesex.*

Offers to lead Field Meetings, exhibit, etc., to: K. H. BOBE, *19 Hengist Road, London, S.E.12.*

Manuscripts, drawings and books for review to: W. J. B. CROTCH, *5 Stanley Crescent, London, W.11.*

Subscriptions (10/- per annum, 5/- for Juniors) to: P. C. LE MASURIER, *85 Warren Drive, Tolworth, Surrey.*

AES BULLETIN No. 124

APRIL 1951

EDITORIAL

This is the Editor's swan song. He is very sad that his appointment to a post overseas means that he is compelled to relinquish his editorial duties with the AES. He has thoroughly enjoyed doing the work and is particularly grateful to all those contributors—members and non-members—who have sent in articles, notes and items of interest; to those kindly critics whose advice has been taken, or not taken, as the case may be; and, finally to Messrs W. J. B. Crotch and H. K. Airy Shaw, whose proof-reading activities and advice on editorial matters have been invaluable. He also is very grateful to Messrs T. Buncle & Co., Ltd., and Messrs Siviter Smith & Co., for their close co-operation and interest in the actual production of the *Bulletin*.

He feels that a change at intervals, whether of Governments or Editors, ensures that progress is maintained and wishes his successor, when he is appointed, the best of luck and the same help and gentle tolerance that he himself has enjoyed.

Meanwhile, contributions and correspondence should be addressed to:

W. J. B. CROTCH,
5b Stanley Crescent,
Kensington, London, W.11.

Members will already know about the foregoing from the cyclostyled note enclosed in the March Bulletin. *The Council would not like, however, to omit from our permanent record their expression of warm gratitude for all the grand work Mr Trought put into the* Bulletin *and many other AES publications. I am sure all members join with us in wishing him great success, good health and good luck in his appointment as Scientific Adviser to Jordan.*

Mr Crotch would like me to stress the fact that he has not the time to undertake the editorship, except as a temporary expedient until a successor to Mr Trought has been chosen.

B. L. J. Byerley,
Hon. President, 1951-52.

ANTS

Alan P. Major's (1117) observation on ants' " nests " being constructed on the stems of ragwort plants (*Bulletin No. 121*, p. 8, January 1951) raises an interesting point, although one or two of his conclusions may not be correct. From my own observations, I think it very doubtful that the particles of earth, which are seen commonly enough encasing stems of small plants, are nests in the proper sense of the word. Where the phenomenon occurs, there are always nests in the soil at the root of the plant; but, as Alan Major himself has noted, there are no obvious signs that a community of ants inhabits the earth-structure above ground. It seems clear, however, that these structures are built deliberately. They take the form of an earth-encasement which follows fairly closely the contours of the stem, often to a height of six inches above ground level. The particles of soil used by the ants are typical of the excavated soil thrown up by them when they make mounds, and are " cemented " together, *in situ*, so that, when dried by wind and sun, they become hard and chip off in tubular fragments.

I used to assume that these structures were erected by ants for the purpose of housing root-feeding aphids, but I cannot recollect ever having found aphids there, and, in any case, it would be illogical to house root-feeding aphids on the toughest part of the stem. True root-feeding aphids are sheltered in specially constructed cavities under the surface of the soil, generally in a fairly central and well-protected part of the nest; while the stem-feeding aphids are not protected in any such way—the ants merely walk to the extremities of the stem where clusters of aphids attach themselves to the most succulent part of the plant, each ant feeding from the aphis after antennal titillation.

If it is to be assumed that these stem encasements are purposive, there must be some other explanation, and I am not clear what it is. Whether

it has to do with protective exit tunnels from nest to aphis feeding perhaps several feet further up the plant, or whether it has something to do with a lower stem protection against creatures inimical to ants, I cannot say, but would be interested to hear of other observers' views. I think it improbable that the phenomenon has anything to do with a precaution against flooding, as Alan Major suggests, as the accommodation provided by such tunnels is quite inadequate in proportion to the size of the colony and brood in the nest below the surface of the ground.

Some species of ant, notably *Acanthomyops niger*, the common brown garden ant, seem to be fond of building tunnels leading away from the nest towards favourite feeding and hunting grounds, as though such measures afforded greater protection, although it must be noted that *A. niger* also roams at will on the exposed surface. I have in my London garden rose bushes, many of which have the lower stem encrusted with soil in the manner described. The soil in which these bushes are planted is thick sub-soil clay (a legacy of explosive interference in 1941); the soil in the herbaceous beds at the sides of the garden is fine top-soil. In the former medium, the ants do not build tunnels radiating horizontally from the nest (a sagacity with which I have back-aching sympathy) whereas in the latter, tunnels are visible in the form of straggling protuberances above the soil, passing in many directions (and here my sympathy wanes considerably).

Much as one would like to attribute all sorts of sinister sociological motives to the behaviour of ants—a favourite and misleading pastime since time immemorial—I think I am on safe ground in saying that this particular phenomenon which Alan Major describes has nothing to do with class distinction. In any case (and with great respect to the Editor's comments on this subject) I think we must recognise that there is with the social insects a functional class differentiation, which does not operate in quite the same way as class distinction, as we understand it. While, in human history, class distinction has functional origins, its perpetuation involves attitudes which gradually become dissociated from pure utilitarian function—a phenomenon which arises from the existence of our interpretative consciousness. This, presumably, is not a problem which agitates any ant; the ants have not had a bible.

The caste system of ants is sensible in relation to their patterns of behaviour. For example, some common species of ant recreate their own kind by a solitary fecund female finding a suitable cranny after the marriage flight, laying a batch of eggs in the late summer, and tending the brood until imago emergence the following spring. This first brood is small and weak by comparison with later broods, and its members tend to remain as the personal attendants to the queen in the inner and safer chambers of the colony. The later broods become the active food-hunters and fighters. Again, there are ant species (not found in this country) where caste differentiation takes place as a result of polymorphism. One of the best-known examples is the soldier-ant, or Jupiter worker, which is born with a much enlarged head of great toughness, and with powerful jaws used either for crushing enemies, or for blocking the entrances to the nest when it is attacked, or for milling hard seeds, which are later stored and tended by the ordinary and much smaller workers. It is thought that these Jupiter types are produced deliberately by means of special feeding and special treatment in the larval period. Indeed, the numerical regulation of caste types is effected frequently by feeding in the larval stage. These instances show that it is incorrect to apply the phrase "class distinction" to such natural phenomena.

Perhaps the most stimulating work on the social psychology of ants is William Morton Wheeler's *The Social Life of Insects* and, more recently, Haskin's *Of Ants and Men*.

A. N. Brangham (18).

GROUPWORK

The following four items were on the list of suggested subjects for groupwork, given in the March *Bulletin*, p. 23 (items 5-8). A leader for a group on Larval Colours is required.—Ed.

THE "BLUES"

Dear Mr. Editor,

I am specially interested in that part of the *Lycaenidae* called the 'Blues', not only for their absorbing number of varieties and aberrations,

but, more particularly, for the study of their geographical distribution.

If a sufficient number of AES members, similarly interested, would cooperate in a group, I foresee tremendous possibilities of collecting information that would be almost impossible for one or two persons.

For example, take the Common Blue (*Polyommatus icarus*). If the group could get a member from each county in which *icarus* occurs (most counties in the British Isles would be included) to exchange, say, a dozen type specimens, there would be an opportunity for comparison and the study of such a problem as how *icarus* changes from a double-brooded insect in England to single-brooded in Scotland. This is only one item of many that would come to light in such a comprehensive network of members.

I shall be happy to carry out a large share in the organization of such a group; there may be only a small number of "Blue specialists," but I am sure when others read in the *Bulletin* of the advances made by the group, others will soon wish to join in.

May I suggest that, to make a start, all members wishing to take part in such a group write to me. I will supply details of results to the Editor for publishing in the *Bulletin* and, as the group grows, I am sure that many members of the group also will wish to write about their achievements and the knowledge obtained.

R. C. DYSON (91).

THE ELEPHANT HAWK MOTH

I find that the rare moths are studied very carefully. Every appearance is recorded reverently, but we are not all lucky enough to find the Spurge Hawk (*Celerio euphorbiae*) or the Death's Head Hawk (*A. atropos*). We are, however, all able to find the larvae of the Elephant Hawk Moth (*D. elpenor*) if we look at the right season on the right food plant.* This is no reason for ignoring it, once we have pinned our correct number of specimens in the box. On the contrary, I think close study of this insect will throw light on many of the problems of the entomologist and biologist.

For instance, why should one moth be abundant all over England, while a relative, so close as to be almost a subspecies, is local, and another close relative is a great rarity? I refer to *D. elpenor*, *D. porcellus* (the Small Elephant Hawk), and *H. celerio* (the Silver-Striped Hawk). Has the balance of Nature been temporarily upset? It feeds almost exclusively on willow-herb, but I should like to know if feeding on a different food plant, say *Galium* or *Impatiens biflora*, would affect it in size, colour or vigour. This could easily be tested by feeding batches of larva from the same female on different food plants, over several generations. This task would be simplified if undertaken by several entomologists. I shall be able, if all goes well, to supply eggs at the proper season, if any volunteers will try to rear them on some different plants (if the larvae are co-operative, too!).

At the same time the ratio of green larvae to brown could be checked, and if necessary the imagines from green larvae could be interbred. This would be a simple experiment in heredity. If, by good fortune, a fertile mating between *D. elpenor* and *D. porcellus* could be achieved, an even better experiment in genetics might be provided.

The value of *elpenor* lies in the abundance, accessibility, and large size of the larva. It can be used in many experiments. Why does it climb to the top of the plant at sunset? Does our dull English weather deceive it at all? Which protects it better, its camouflage or its terrifying appearance? These can be ascertained in the field by continued observation and experiment. For example, a hundred larvae could be released into natural conditions and the number of survivors could be checked quite easily, or controlled experiments could be devised with the exercise of a little ingenuity.

I put myself forward as a collector of facts on *elpenor*. If members are willing and able to let me know how many *elpenor* larvae they found in their districts in 1950, at what time of day or night, on what plant, in what position and how many of them were ichneumoned and, if possible, the species of the parasite, I shall be delighted. Moreover, if you could give me the same information about *porcellus*, I should be deeply grateful.

J. H. JOHNSON (1040).

*A note on this will appear in a later *Bulletin*, nearer the time.

'WARE CANNIBALS

Since the publication of a note under the above heading (*Bulletin 114*, page 56) I have had occasion to note two further species with this distressing tendency, i.e., *Orthosia miniosa* L. (Blossom Underwing) and *Agrotis segetum* Schf. (the Turnip Moth).

In the case of *O. miniosa*, it is of interest to note that in the last two stadia the larvae feed on galls, i.e., *Spathegaster baccarum* L. (Currant Gall) and *Teras terminalis* F. (Oak Apple) (*Entom.*, **77**: 159). Presumably the inhabitants of the galls are devoured with the vegetable matter.

In captivity, I have noticed the larvae walking about the cage with the half-eaten remnants of a relative in their jaws. This occurred only in the last two stadia, which happening makes me suspect that the gall causers are a necessary part of *miniosa's* diet.

In the case of *A. segetum*, Miss Barbara Hopkins (827) writes to say that the species is very cannibalistic and a brood reared at Harpenden had to be confined in separate containers.

Following the development of the groupwork idea, as " Larva-adviser " to the Society I suggest that any small items of news, possibly not worth separate publication, concerning larvae or their foodplants, parasites, etc., could be sent to me. I will then endeavour to co-ordinate all the scraps of information and from time to time send articles to the Editor, incorporating all the worthwhile data secured in this manner—of course, crediting each published item to its author.

One thing, however, I do beg, is that each contributor tries to make his, or her, note original; and also that a stamped envelope be enclosed if a reply is required.

H. E. HAMMOND (423).

I read with interest Mr Hammond's article, " 'Ware Cannibals," in *Bulletin No. 114*, p. 56. Here is a recent experience of my own. On September 22nd (1950) I put four caterpillars of the Ruby Tiger Moth (*Phragmatobia fuliginosa*) in a jar with some heather and two specimens of the grasshopper *Chorthippus parallelus* Zett. These specimens were all kept in the dark and when I looked in the jar on September 25th I found that all that remained of the two grasshoppers was a head, two hind legs and some fragments of elytra of the male. The caterpillars were in the best of health!

T. B. POOLE (1681).

BRITISH ORTHOPTERA

Readers will recall, in last year's *Bulletin*, two articles on the *Orthoptera* by Mr Peter Michael (748). The first (p. 62) appealed for co-operation† in investigating the distribution of, and variation within, the group; the second (pp. 102-3) gave some interesting notes and observations on a particular species (*Leptophyes punctatissima*), and renewed the appeal for co-operation. Whereat the Editor chipped in with: " This seems a case for 'groupwork,' " and I for one certainly look forward to the formation of an active *Orthoptera* and *Dermaptera* Group.

We hope, too, that Mr Michael may be able to co-ordinate its activities, though neither Mr James Ranger (1002) nor the writer has so far succeeded in contacting him at the address given. Mr Ranger (Isleworth), Mr Ian Menzies (545) (Teddington) and the writer (Kew) already form a compact group of Orthopterists on the western outskirts of London, and we should like to hear of any others within reach.

The following are some objectives, additional to the two mentioned by Mr Michael, to which the Group might give its attention.

(1) **Ecology**: i.e., habitat in the widest sense, including such factors as soil, plant-communities, altitude, illumination, temperature, moisture, proximity to sea, etc.

(2) **Bionomics**: i.e., life-history, including oviposition, plants or other situations preferred, hatching, dates of appearance of each instar, principal food-plants, etc.

(3) **Behaviour**: especially stridulation and courtship.

To judge by the number of notes on *Orthoptera* which have appeared in British literature, alone, in recent years, there would seem to have been a marked increase of interest in this group within the last decade, or even less. It is desirable that all who

†An even earlier appeal, by Mr. James Ranger, appeared in *Bull. No. 100*, 20 (April 1949).

intend to do serious work on the group should familiarise themselves with these articles, both for their own sake and also to avoid duplication of effort. Special attention may be drawn to one of the most recent—"The Egg Pods of British Short-horned Grasshoppers," by Dr N. Waloff, in *Proc. Roy. Ent. Soc. Lond.*, ser. A, **25** (10-12), 115-126, figs. 1-10 (Dec. 1950)—a study of unusual interest, and one that breaks what is probably fresh ground to the majority of amateur orthopterists. It is a good example of the kind of thing that the "Group" might tackle.

There is plenty of scope for the exercise of ingenuity in attacking orthopteran problems. For instance, Ian Menzies has made good use of his peculiarly acute sense of hearing to track down crickets and grasshoppers by their 'song,' often being able, with practice, to identify them by this means alone: see his notes in *E.M.M.* **81**, 252 (Nov.), 274 (Dec. 1945): **82**, 39 (Feb. 1946); **83**, 85 (March), 151 (June), 280 (Nov. 1947). Other sharp-eared AES members, please copy! Mr Bernard Verdcourt (formerly AES 899), a keen microscopist, discovered the previously unknown fact that the principal food of *Tetrix* spp. (in Bedfordshire) was the leaves of mosses, by the process of analysing their faecal pellets: see *E.M.M.* **83**, 190 (Aug. 1947).

I would particularly commend the *Orthoptera* as a possible field of study to any of our members who this year may be fortunate enough to visit any of the Field Centres of the Council for the Promotion of Field Studies. Information regarding the C.P.F.S., to which the AES is affiliated, will be found in *AES Bull. No. 100*, 20 (Apr. 1950), *No. 108*, 96 (Dec. 1949), and *No. 122*, 14 (Feb. 1951).

H. K. Airy Shaw (545).

HUNTING INSECTS BEHIND THE IRON CURTAIN

"Return to unit immediately, repeat, immediately." Thus read the telegram from my C.O. which arrived on the last day of my hard-earned leave, and I hastily complied, wondering which undetected crime had been brought to light. However, when I arrived, I was told to pack up as I was posted to B.A.F.O. After 72 hours, I was home again for embarkation leave, and before I left I ensured that a minimum entomological outfit was in my kit.

After several days of travelling our draft arrived at Buckeburg, where I was instructed to proceed to Gatow. The next day, after about 1½ hours' flying, we landed at the world's busiest airport

Gatow airfield is in the south-west corner of the British sector of Berlin, about 15 miles from the city, and, in fact, one side of it runs along the Russian zonal boundary. The soil is extremely sandy and the vegetation consists largely of pine plantations. Some parts of the airfield are under cultivation and there were also areas of rough grass which were cut occasionally. There was one of these grassy patches, at the back of the Quarters where I worked as a Nursing Orderly, which could be conveniently surveyed from the window during slack periods. It is surrounded by trees, so we were pleasantly secluded, being some way from the actual runways. The large lake, the Havelsee, is not far away.

As soon as I had settled in I started to wander around with my net and collecting tubes, watched by the rest of the staff with a peculiar look of half surprise and half pity which I had encountered before during my service! However, they soon got used to it, and my reputation spread, and before long even the W.R.A.F. were coming up with match-boxes and asking what they had caught. The Medical Officers were also interested, and one specimen is recorded as being "Shot down by M.O." The weapon used was a hypodermic syringe filled with chloroform, a jet of which hit the insect fair and square. In the end nearly all the staff, British and German, had become interested, and it is very largely due to this that many of the species were brought to my notice.

This is not intended to be a full survey of the insect life of Gatow, where most of my collecting was done, but is a list of the most noticeable insects which either I came across or my friends brought in to me. We had a reasonable amount of spare time, but there was plenty to do, and another activity, sailing, took a fair portion of my time. On the whole, the weather was fine and sunny and most expeditions were reasonably productive. The period covered is from mid-April to mid-September 1949, during which time I was continuously on the station,

except for three weeks' leave in late July and one or two other short breaks.

Some of my identifications are not very sure, but I have managed to check several identities by various means, since I returned.

Some of the more noticeable insects recorded between April 14th and September 13th, 1949, were:—

Orthoptera. A Tettigoniid, which keys out (Hincks 1949) as *Tettigonia viridissima* Linn. and agrees with Burr's description, was frequently found on herbs and trees. It sang loudly, being especially noticeable at night.

Two species of *Acrididae* were seen which had red and blue hindwings respectively. They would leap with a flash of colour and then settle, becoming almost invisible. They were presumably *Oedipodinae*, the former probably being *Oedipoda caerulescens* Linn. which occurs in the Channel Isles and the Scillies. Their habits are in agreement with Burr's description.

Gryllus campestris Linn. was heard singing in late May and June. One specimen was brought in to me.

Neuroptera. The only ones noticed were three *Myrmeleonidae*, two of which came to light on the evening of August 5th and one on August 21st. No larvae were seen.

Lepidoptera. Many of the commoner English butterflies were noted; *Chrysophanus dorilis* Hufn., *C. alciphron* Rott. and *Papilio podalirius* Linn. were also seen.

Among moths, one *Dendrolimus pini* Linn. was seen. This moth occurs in a number of forms and Seitz, recording this, regrets that this species does not occur in Britain, as if it did Tutt would have worked them all out!

Coleoptera. Not very intensively studied. Among species of interest were:—*Oryctes nasicornis* Linn.—a large species with a prominent horn on the head; *Carabus auratus* Linn.—a very handsome ground beetle; *Hydrophilus piceus* Linn.; *Cetonia* sp. (? *aurata* Linn.)—frequently seen or brought in; *Amphimallon solstitialis* Linn.—called " Junikäfer " by the Germans; a beetle on asparagus resembling *Crioceris asparagi* Linn. in structure, but slightly larger, with five black spots on each of the red elytra[1].

Hymenoptera. Many nests of *Formica rufa* Linn. were found in the pine woods.

Diptera. The only two noticed were a large Tabanid[2] (21 mm. body length) and a Syrphid with an orange and brown body, possibly *Volucella zonaria* Poda. (Identification confirmed by E. W. Classey (41)).

C. D. PUTNAM (1383).

[*Note:—It is clear from articles and letters sent to the Editor that the ' call-up ' need not mean abandoning entomology entirely; the pursuit of entomology may prove, indeed, of interest to comrades as well. For reasons of space the full list of species seen or caught by Mr Putnam has had to be cut down.—Ed.*]

THE COLLECTOR IN INDUSTRIAL AREAS

Part 3 (*continued from Vol. 9, p. 107*)

Breeding and Rearing

It has been said that you cannot really understand any species until you have reared it from egg to egg. This may not be completely true but I do agree that the man who only collects and never does any breeding or rearing is not a true entomologist. There are some collectors of the town districts who make the excuse that they have no facilities for larva rearing, but this is a poor excuse indeed. For some years as a boy my facilities were so limited that I kept all my living specimens in an orange box outside. The front of it was covered with a waterproof sheet and the insects were in tins inside. During the winter it was frequently buried in snow and in summer it was just about baked, but some of my most treasured specimens were raised in that box and, certainly, no facilities since have given me greater pleasure. The town dweller must above all possess the determination to overcome the difficulties. The following points may assist the young collector to get some degree of success even where no garden or other facilities exist.

Housing. A small outdoor shed is the ideal home, but failing that any spare corner which can be adequately ventilated. This point about ventilation is most important, for without adequate air supplies a great many

Later identifications: [1]*Crioceris 12-punctata* Linn. [2]*Tabanus sudeticus* Zeller.

species will not survive. Your insects will stand any degree of cold and up to 100° F. during the summer. You should have a thermometer hanging in a representative position. Avoid direct rays of the sun and do not keep any specimens in damp situations.

Pairing. Almost without exception insects are more likely to pair in the open air than indoors. For this reason a gauze cage about a foot square should be used. The cage should be placed where a free current of air can reach it. This air current is the secret of getting results with a large number of moths. On one occasion I had difficulty in getting pairings from some "Tigers" which I particularly wanted to breed. Nearly fifty moths ruined themselves indoors without a single mating; but then I placed my last six specimens, three of each sex, in a small cage outside and within an hour all three pairs were *in cop.* In my experience a large space is unnecessary with most species so long as moving air currents are allowed.

Larva rearing. There are more pleasures and more disappointments from this aspect of our study than any other. No-one gets 100% results and some years we don't even get ten per cent. Nevertheless, knowledge and results are to be obtained in this way. The object of this article is not to give directions for rearing larvae but rather to help in the difficulties which will be peculiar to the town dweller. Undoubtedly food supplies present the greatest problem, but I have largely overcome this by the following means:—

(a) Enlist the aid of local botanists and obtain from them lists of all local plants. A few walks with these friends will reveal the sites of the commoner plants (rarities should not be used as foodplants).

(b) Study alternative foodplants. There is a good list in the *Text Book* by Newman & Leeds, but you will need a much more comprehensive one, for many common plants are not readily available to town folk.* Sometimes gardeners are most helpful in providing a related plant.

(c) Most species have not adapted themselves to the smoke-pollution of the towns; it is therefore very wise to provide whenever possible leaves which are clean and fresh. Toward the end of the season most plants are black with soot deposit. Take the trouble to wash such leaves and the results will be worth while.

(**Larval Foodplants*, by P. B. M. Allan, is recommended, as Newman & Leeds may not be easy to get.—ED.)

W. E. COLLINSON (247).

MATING IN ROVE-BEETLES

Whilst it is a common occurrence to find some of the plant-feeding beetles (*Phytophaga*) in copulation, it is not nearly so frequently that one finds the *Staphylinidae* (' Rove-Beetles' and 'Devil's Coach Horses') in a similar situation. This fact, perhaps, can be accounted for in that the *Phytophaga*, like the *Lepidoptera*, are dependent upon the foliage of their particular food-plant and the time of its appearance. This would therefore regulate times of copulation, ovipositing, etc., especially so when two broods occur during the summer months. The greater number of the *Staphylinidae* are not regulated by the leafing of any plant, as they are carnivorous. It follows, therefore, that, whilst it is usually reckoned that the perfect insects are more abundant during the spring and autumn, the beetles and the larvae can be found at the same time—the larvae often in various stages of growth. In all my collecting of the Staphylinids, I have noted only the following species in copulation in the field:—*Staphylinus ater* Grav. and *Gyrohypnus punctulatus* Goez. in the month of April, and *Stenus* (*Hypostenus*) *fulvicornis* Steph. in August.

The above thoughts were prompted by the finding of a number of specimens of *Quedius xanthopus* Er. in folded sacks in a farmyard in Devon on Dec. 24th, 1950. The sacks were quite stiff with frost, but I found three males and six females, one pair of which were *in cop.*! I also took three female *Quedius mesomelinus* Marsh. and one *Tachinus subterraneus* L. Perhaps other coleopterists could add their observations to the above?

H. LAST (117).

I found a pair of *Staphylinus siculus* Stierl. *in cop.* under a stone in Gloucestershire on April 5th, 1945. See C. C. Townsend, The Staphylinidae and Pselaphidae of Glos., *Proc. Cotteswold Nats. Field Club, 1948*, **30** (1), 57. I cannot recall another instance.

H. K. AIRY SHAW (545).

CONTRASTING UNDER-SIDES OF HETEROCERA

How surprising the small amount of attention that has been given to the under wing-surfaces of moths! Whenever I examine a collection of *Lepidoptera* I never fail to observe the fair representation of butterfly under-sides, but I have yet to see a similar display in the moths. It is agreed that in most cases the under-sides are of a sombre uniform shade, comparable with the ground colour of the top surface, yet there are some striking exceptions. We all know that many butterfly underwings are designed by Nature for the purpose of protective mimicry, or camouflage, as are the upper forewings of a great many Bombyces and Noctuids, but there is surely scope for much scientific research into the reason for those few outstanding departures from the rule.

Let us take a few species at random which present a complete contrast above and below. *Smerinthus ocellatus* (the Eyed Hawk), absence of "eyes" on under-side of hindwings; *Deilephila elpenor* (the Elephant Hawk), always more vividly beautiful on under surface of wings, thorax and abdomen; the Catocalids; some of the *Arctiidae*; *Euclidimera mi* (the Mother Shipton); *Hepialus humuli* (the Ghost Moth). These are but a few examples. In the case of the *Geometridae*, some examples show an unmarked under-side while in others the top surface markings are carried through.

Apart from the mystery of Nature's reason for thus adorning certain of her children, it seems incredible that so many entomologists who regard beauty as an asset to their scientific collections should have overlooked the opportunity of enhancing their work by 'turning over' a few specimens, especially where complete life histories are displayed. In my opinion, a collection of *Lepidoptera* can only be of the fullest value when every stage of metamorphosis is included and, where possible, all stages of their parasites. Why not, therefore, finish the task by including one or two undersides and an imago in normal resting position?

At first glance the underside of a male *Euproctis similis* (Yellow Tail), with its clouded forewings, conveys the impression of a remarkable "var", when included in a row of top sides; but I have yet to see it in a collection other than my own.

Paul H. Holloway (429).

FOODPLANTS WHICH DRY UP QUICKLY

During hot weather and when kept in wooden cages, many foodplants, especially hard leaved trees, such as elm, oak, beech, etc., very quickly dry up and are then useless. This can be very troublesome to those rearing larvae where a particular plant is not easily accessible, especially to town dwellers like myself, who to get, for instance, wych elm or Scots pine, have to journey several miles.

I have surmounted this difficulty in some degree as follows:—

Gather a supply in a vasculum and on arrival home well bruise the stalk ends, and at once place in a vessel of water. Place the foodplant and container in a large tin, such as a biscuit tin, replace the lid and stand in the coolest spot available.

Treated thus, some of the very worst plants will last a week in perfect condition.

It is advisable to open the tin daily to admit air and also to remove any excess of moisture on the inside of the tin, and also to air the plants for a few minutes before feeding.

In the case of Scots pine, do not place in water, but keep in a separate air-tight container. In any case, if you must use cut Scots pine never place it in water. It should be either growing, or used dry, or casualties from purging will be very large.

It is important when keeping the plants in this manner to see that no mould forms, and to avoid this the large tin should be scalded out and dried at frequent intervals.

H. E. Hammond (423).

CORRIGENDA

Bulletin, March, 1951. P. 21, col. 2, l. 17. For *Achantocilis aedilas* read *Acanthocinus aedilis*. P. 31, col. 2, l. 19. For *antigua* read *antiqua*. *Ibid*., l. 31. For *bartarum* read *barbarum*.

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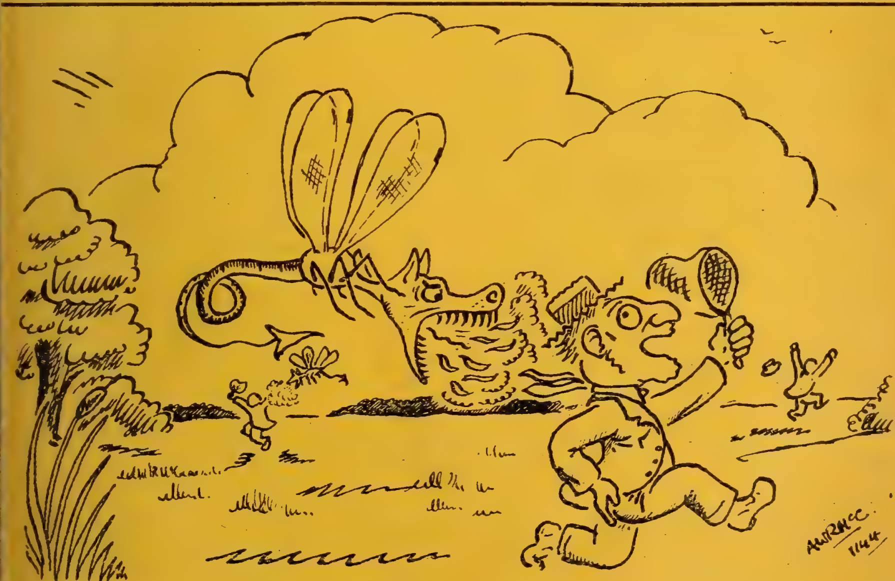

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EDITED by W. J. B. CROTCH. M.A., A.K.C.

AES BULLETIN

No. 125

MAY 1951

YOU CAN HELP US ALL

In these times of rising costs, we want to be exceptional in keeping our low subscription rate steady and at the same time to maintain, or even increase, the size of the *Bulletin*. There is only one way to do it. We must treble our membership. Will *you*, therefore, straightaway think about your acquaintances and set yourself to persuade at least two of them to become members soon? If a copy of the AES Prospectus would assist, write to the Secretary for it (with a penny stamp enclosed to save our funds).

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●

X-RAYS AND INCUBATORS

February 1951 was greatly enlivened by the hatching out of larvae of the Grass Eggar (*L. trifolii*). Some 250 eggs had been obtained from parents bred from larvae found at Formby in May of last year. The hatch began on February 8th and is still continuing up to the time of writing (March 10th), several coming out each day. This spreading out of the hatch over several weeks has been noted before and evidently accounts for the fact that in May, when the wild larvae can be found, they vary very greatly in size. Tutt thinks that the long hatching period may safeguard the species against adverse weather conditions. Some of the larvae had difficulty in getting out of their egg-shells, but with a paint brush and a fine pair of forceps a Caesarean section was easily performed. It was found that after putting a piece of damp wool with the eggs the number of operations necessary fell considerably.

The young larvae (which do not eat their eggshells) grow very slowly, eating a little only of ordinary grass or clover leaves. It was noted that they would not touch evergreen tree-lupin leaves although the ordinary lupin had been very much favoured by their parents. From birth the caterpillars exhibited their well-known characteristics of curling up en masse when the lid of the tin was opened.

Some very elementary X-ray work was done in January on a few of the *trifolii* eggs in an endeavour to find out (a) the minimum lethal dose, and (b) whether genetic changes could be produced, giving rise to varieties in the perfect insect.

All that can be said at present is that the batch given the maximum dose of 200 roentgen have hatched out and that the caterpillars look normally healthy. It seems likely that when the eggs were irradiated in January the larvae were already formed within the shell, but further evidence is sought on this point; if it is so the induction of genetic change would be much less likely than if the eggs were in the undifferentiated state. 200 r (100 kv, 5 milliamps, no filter) is quite a small dose—about 300-500 r being needed to produce redness and temporary skin damage in a human being, and it is not, therefore, very surprising that the caterpillars withstood it, particularly if they were fully differentiated within the egg. All the eggs referred to above were kept indoors, but in a cold upstairs attic.

Nearly 200 Northern Eggar (*callunae*) larvae (from two Cheshire females assembling wild males) have wintered indoors in our living-room, grossly overcrowded, but almost without a death. They have fed on privet and some bramble leaves have

also been obtainable throughout the winter. The majority are now a third grown, but a few are almost ready to spin up. These are the ones which have been opportunist enough to feed consistently all the winter. The generality have spent long periods dozing in the dry heather in the bottom of the cage.

If you ever want to buy yourself a fascinating Christmas present, and, incidentally never to have a quiet moment, you cannot better an incubator. Mine is 32″ × 43″ × 38″, and even in early March there is standing-room only. The mean temperature is between 60° and 70° Fahrenheit. The writer has had no previous experience of this type of work, but even after six weeks it is apparent that response to the heat is very variable. The most remarkable larvae were those of the Scarce Vapourer, *O. recens*, who continued to slumber in the summer warmth surrounded by the luscious buds of forced blackthorn. It was discovered that by forcibly waking the caterpillars up and keeping them moving round their glass cage they could be persuaded to nibble. Once they started to eat it was easy. Their metabolism was probably stimulated and thereafter they fed up fast. Small batches of *callunae* and *dominula* larvae were found to eat ravenously in the incubator and the former nearly doubled their weight in a week. (N.B. 21 small *callunae* weigh ½ oz.!) Pupae of the Hawkmoths *C. elpenor* and *D. tiliae* have shown no sign of emerging after a month of heat. Three Pale Tussocks (*D. pudibunda*) have, however, been accelerated, two emerging on March 7th and one on March 8th. It is of interest, though, that a deformed control male, kept in the cold attic, beat them to it. He came out on February 17th.

The writer would be glad of information from those who have had experience with incubators.

C. A. Clarke (1569).
High Close, Thorsway, Caldy, Cheshire.

The Editor had been told that lepidopterists who had thought of making use of the public X-ray machine at the Science Museum, South Kensington (which reveals for a few seconds the bone-structure of one's hands) had always found that pupae were killed by the very brief submission to X-rays. The "dose" of this machine is, no doubt, a very safe one, so that the emergence of Dr Clarke's larvae may be more astonishing than he had supposed. We hope he may lead a group in studying both incubation and X-rays.

DISTRIBUTION OF CERTAIN WATER-BEETLES IN BRITAIN

Can any member of the AES interested in Coleoptera give me any information regarding the distribution of *Hydrophilus piceus* and *Dytiscus marginalis* in the British Isles?

Here, in the Furness district of North Lancashire, they are both apparently non-existent. Is there any reason why one particular district should completely lack these species?

Donald G. Allan (1804).
Dalton-in-Furness, Lancs.

Professor W. A. F. Balfour-Browne (340), AES adviser on water-beetles, to whom this question was referred, sent distribution maps of the two species and wrote as follows:—

There is no published record for *Dytiscus marginalis* for the Furness district of Lancs. In the system we use for recording the occurrence of animals and plants, North Lancs., i.e., the Furness area, is included with Westmorland, so I have gone through all my records, published and otherwise, for that county, and all are definitely for Westmorland county.

But I do not think that this means that the species does not occur in that area. The insect has been found all over Britain with not many counties without a record, and I expect that a search for it would produce it. Patches of water grass (*Glyceria*) at the edges of ponds and in quarry holes are likely places.

The absence of *Hydrophilus piceus* from North Lancs. is a different matter. This insect has been recorded from only 22 English counties and vice-counties, of which only 4 are north of a line drawn from Pembroke to the Wash. These 4 counties are Leicester, Derby, South-West Yorks, and South Northumberland; south of these, *Hydrophilus* is not common in all the counties in which it has been taken. It belongs to the south-eastern group and is usually common in the fen districts. I have taken it in some numbers in East Norfolk, Cambridge, East Kent, East Sussex and North and South

Somerset. I think that the more northern records indicate attempts on the part of the species to extend its range, attempts that have had but indifferent success.

Fig. 1. Dots indicate that the sp. has been recorded. Black shows where Professor Balfour-Browne has taken it or seen specimens purporting to have been taken there.

Fig. 2. Indications as for Fig. 1.

MACROPTEROUS FORM OF *CHORTHIPPUS PARALLELUS* ZETT.

In answer to the query at the end of T. B. Poole's note on the above in *Bulletin No. 122*, p. 14 (Feb. 1951), the following papers, at least, have been published since the appearance of Burr's *British Grasshoppers* (1936).

Clark, E. J., 1942, Occurrence of *Chorthippus parallelus* (Zett.) f. *macroptera* in Britain, *Ent. mon. Mag.*, **78**: 161-166.

Collins, G. B., 1943, *Chorthippus parallelus* (Zett.) f. *macroptera*, *Entomologist*, **76**: 86-87.

——, 1945, Some observations on macropterism in *Chorthippus parallelus* (Zett.), *Ent. mon. Mag.*, **81**: 179-182.

Brown, E. S., 1945, Occurrence of macropterous *Chorthippus parallelus* (Zett.) in Scotland, *Ent. mon. Mag.*, **81**: 251.

H. K. Airy Shaw (545).

•

SOME NOTES ON *GRAPHOCEPHALA COCCINEA* FORSK.

This insect is a member of the *Hemiptera-Homoptera*, series *Auchenorhyncha*, family *Tettigellidae*. In 1935 this bug was introduced from America into Britain. Since that date it has spread as far as Dorset, Cheshire, and Monmouth. It has been common in Richmond Park, and at Hampstead, for some years.

The foodplant for the nymphs and also the adults is the Rhododendron, of which it prefers the small leaved varieties. When the nymphs are full grown they are green, and look very like the adults. When their last instar is reached, they attach themselves by the posterior end to the underside of a leaf. The skin of the head and thorax then ruptures and the imago emerges. After the wings have dried the insect is ready for flight. There is a quite audible clicking sound produced when it flies.

The Elytra are green, with two red streaks across them. One of these streaks runs from the base of the elytra, down the clavus; this is the broader band of the two. The second band runs parallel to the clavo-corial suture, but down the cubital nervure. It widens towards the apical region. The costal nervure is covered with yellow pigment, and the apex of each elytron has an irregular black border.

The hindwings are black, but transparent. The abdomen is orange above and yellow below. The scutellum and the vertex are of a light biscuit colour, while the thorax is green with two yellow markings at the junction of the scutum with the head.

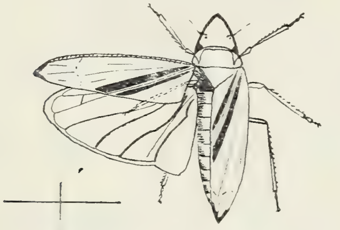

Fig. 3.

I do not think that there are many varieties, but one has come to my notice. This had the green on the thorax replaced by black, and similarly the normal green markings of the thorax were black.

If there are any members who know of localities where *Graphocephala coccinea* occurs, I would be grateful for details, as I am now trying to find how far it has spread.

M. A. SALMON (1577*).

PROBLEMS OF LOCAL VARIATION (1)

Five species of the *Satyridae* inhabit the coastal strip of West Cumberland. The populations of two of these, *Maniola jurtina* (the Meadow Brown) and *Coenonympha pamphilus* (the Small Heath) are in direct contact with populations to the North, South and East. But the populations of the other three species, *Pararge megera* (the Wall), *Eumenis semele* (the Grayling) and *Maniola tithonus* (the Gatekeeper), are fairly effectively isolated from other populations of the same species. The isolation of *M. tithonus* is complete, of *E. semele* possibly slightly less so, and of *P. megera* rather less still. Yet the isolation of all three has been sufficient for very noticeable trends of local variation to develop in each case. The curious and interesting fact is that all three show a tendency in exactly the same direction—towards the development of strongly-marked specimens with additional spots. Of course, it will be clearly understood that by no means all West Cumberland specimens show these characteristics, but in my experience they do so with unusual frequency as compared with populations of the same species which I have examined elsewhere. Other readers may be able to produce evidence of similar trends of variation in other areas, and, if so, the results may prove to be very interesting indeed, particularly if it should happen to turn out that some similar trend has been noticed in an area of similar topography and climate to that of West Cumberland.

The area in which the three species under review occur is along the coast, on rough ground on Triassic (St Bees) Sandstone. The climate is wild and wet, and the area receives the full force of the Atlantic depressions. It is not, however, normally at all cold in winter. In spite of the exposed nature of the ground and the extreme frequency of wet and windy days the three species are very plentiful in the somewhat restricted area in which they occur, which is, in fact, the most exposed strip of all, for they thin out and disappear as soon as one leaves the close proximity of the sea and reaches calmer and more sheltered ground. One is driven to ask whether there is any connection between this particular type of habitat and the particular type of local variation which these three species exhibit. The fact that the three all show a similar tendency suggests, though perhaps quite wrongly, that there may be some such connection.

Pararge megera (the Wall) is not normally thought of as a variable species, yet in West Cumberland specimens frequently occur considerably suffused with black, particularly in the central band of the forewings of both males and females, tending towards the phase which appears to be known as ab. *fasciata*. Not very infrequently extra spots appear below the apical spot as well as above it, the apical spot itself being often bipupillated or even virtually double. The central band of the male tends to become narrower as it becomes darker, and occasionally this tendency is very striking. In my experience all these phases of variation are more noticeable in the spring than in the summer brood.

Eumenis semele (the Grayling) is, likewise, not normally very variable. But in West Cumberland the markings tend to be extremely heavy and

not very rarely two, or even three, extra spots occur in the pale margin of the forewings, and extra spotting of the hindwings is also not uncommon. Sometimes the extra spots on the forewings are confluent, making a band with several white eyes. I have seen as many as *six spots* on each forewing instead of the normal two. These extra-spotted specimens can usually be found at the rate of perhaps two or three in a couple of hours' hunting, indicating a much larger proportion than in my experience can be expected elsewhere. But what is almost constant in West Cumberland is a characteristic whiteness of the underside of the hindwings, particularly in the male. The typical West Cumberland male is much more extensively white on the underside of the hindwings than is the case in any other locality which I know, even on chalk or limestone, except for sub-sp. *thyone* from the Great Orme. In no other way whatsoever do the Cumberland specimens resemble sub-sp. *thyone*, but in this respect they are most strikingly similar, in spite of the fact that the Cumberland population inhabits ground with a dark soil on deep red rock. This particular local characteristic is the only one which does not clearly fit in with the general tendency towards the production of dark specimens, but the upper sides fully compensate for this by their darkness.

Maniola tithonus (the Gatekeeper) in West Cumberland shows a remarkable tendency towards the production of extra spots, those with two extra spots, sometimes large and ocellated, below the apical spot on each forewing being by no means uncommon. Extra spots on the hindwings, sometimes lanceolate in shape, are also very frequent. Generally the patterning is heavy and dark, even when extra spots are not present, though the apical spot is more variable than I have found it to be elsewhere, specimens with only one or, very rarely, no white pupils being found. These, however, are not so characteristic as is the form with heavy markings and two extra spots: several of these can be found in an hour's hunting. Specimens with one extra spot on each forewing are strangely rare compared with those with two, though they do occur; but I have never come across any with more extra spots than two, though the number of extra spots on the hindwings is more variable. The extra-spotting is about equally frequent in each sex.

It will thus be seen that these three species all exhibit the same tendency in the same habitat. One is, of course, dealing with a question of proportionate numbers and a careful analysis of this would be most interesting, though it would require more time than the average amateur naturalist could give to it; meanwhile, it may be that more light can be thrown on the foregoing facts if any similar tendency can be reported from elsewhere.

J. DE VINE HALL (1520).

(To be concluded)

Comment:—

P. megera. *On the forewings, the* bipupillata *and* excessa *spottings, up to 4, including 2 near apex, are more or less frequent and widespread, but include any with more spots in this report.*

E. semele. *The six spots on the forewings* = antiquadriexcessa *are most extraordinary, also downwards fusing together of spots* = antitransversa. *In some species this fusing occurs in* decrescens *forms owing to absence or fragmentation of some of the veins. Ground colours do vary considerably, e.g., lighter on chalk and browner on dark soils, but* vice versa *forms do sometimes occur among them.*

M. tithonus. *The* excessa *spottings are widespread and can develop almost anywhere. Here, near Wood Walton, Hunts., an arable field became derelict and when grasses and bushes grew on it ordinary* tithonus *commenced there. Each year* excessa *spotting became more common, but small, until in the last two years a few with 2 large spots below the submedian spot occurred on the forewings* = crassiexcessa. *Then the bushes were cleared and the field ploughed. This was on clay soil and I have found* crassiexcessa *on chalk, sandy, gravelly and other soils, but locally more numerous, near the coast and inland, in Devon than elsewhere; the article mentions a similar large proportion occurring in the far distant strip of West Cumberland.*

As an enquiry regarding Coenonympha pamphilus, *can anyone report more than a total of 4 spots occurring in the submedian row on*

any wing—except the underside hindwings? An additional spot, near the costa of forewings, if present, should be counted.

H. A. LEEDS (282).

A METHOD OF MEASURING UNEQUAL BEETLE COLONISATION OF CATTLE DROPPINGS

A short while ago it was noticed that the holes made by beetles around the edge of cattle droppings were unevenly distributed. No apparent cause could be found. In order to get some estimate of how the numbers varied around the sides the following simple procedure was adopted.

A square hole, measuring 5×5 cm., was cut in a piece of stout cardboard which overlapped this size by about a centimetre all round. The card was then covered with 'sellotape' which made it more waterproof and hence more serviceable. This measuring square was used by placing it at the eight principal compass points around the edge of a dropping. To aid in this an eight armed guide, with each arm at 45° to its neighbours, was constructed. The numbers of holes occurring in the area of the square were then counted. These counts were made on 30th September 1950, near Crewe, Cheshire.

Only droppings in Mohr's (1943) stages 2 and 3 were examined, and in order to avoid any selection a line straight across a field was followed, the first ten droppings in the correct stages being examined. The holes counted varied in size from those of small Staphylinids to those of the yellow and black species of the genus *Aphodius.* (Mostly *A. contaminatus* (Herbst) at this time of year in this district.)

The results are given in the table below.

TABLE I.—Nos. of beetle holes per 5 × 5 cm. square.

Dropping No.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
1.	18	20	15	34	9	5	12	12
2.	15	13	17	20	10	13	4	15
3.	5	14	5	1	7	4	5	5
4.	19	30	4	11	11	9	8	11
5.	12	16	6	5	9	5	6	8
6	22	23	28	22	17	19	16	15
7.	20	22	26	8	11	16	7	9
8.	13	21	20	13	8	12	8	36
9.	19	25	21	8	14	9	7	12
10.	14	42	31	24	11	11	3	4
Total	157	226	173	146	107	103	76	127

The totals may be expressed in the form of fig. 4, which gives a clearer picture of the distribution.

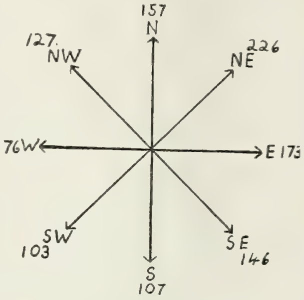

Fig. 4.

It thus appears that the northern and eastern sides are more heavily colonised—though the number of holes may not be a reliable guide—a point worth investigating.

After consideration of what factors could possibly cause this uneven distribution, it was decided that the direction of the wind was the factor concerned. Other factors considered—slope of ground, size and shape of dropping, and length of nearby grass, could not be correlated with the distribution.

If the beetles are attracted to the dropping by a chemical stimulus which tends to diffuse equally in all directions, then the effect of a wind will be to concentrate the stimulus on the side of the dropping away from the direction from which the wind is blowing. Since the prevailing winds in the district are from the south and west, the stimulus will be strongest on the north and east, so that more beetles will tend to settle there than elsewhere.

The above investigation has been on a small scale; it would have been much more satisfactory to have examined many more droppings, but time did not permit. If carried out on a larger scale in places with various prevalent winds, together with determinations of the species actually present, this type of work might yield interesting results.

J. GREEN (1044).

APPENDIX.

Since the stages defined by Mohr (1943, *Ecol. Monogr.*, **13**: 275-298) may not be generally known, they are given below.

1. Pioneer stage, in which the freshly deposited dung is greenish-brown with tarnish and film.

2. Uniformly brown and moist.
3. Blackish-brown with moist depressions.
4. Brown with distinctly drying crust.
5. Light-brown with very thick crust.
6. Light-brown chip, and dry throughout.

A CHIRONOMID LARVA IN A MOLLUSC

The mantle cavity of the common mussel (*Mytilus edulis*) supports a rich and varied fauna—including protozoa, nematodes, rotifers and copepods. Some are swept in by the feeding and respiratory current, some seek out the mussel and live in its mantle cavity from choice.

On March 24th, 1950, whilst examining mussels collected from the Gann flats near Dale Fort Field Centre, Pembs., a Chironomid larva was found inside one of them (unfortunately, it was later lost and so could not be identified more closely). This larva was obviously too large to be affected by the ciliary currents of the mussel and so must have made its own way into the mantle cavity. Whether this was by accident or design is not known—but the larva would find this a most luxurious place in which to live. It would have a current of aerated water, protection from fish and other predators, and when the tide was out the water retained by the mussel would be much more congenial than the conditions outside, where, though the risk of desiccation is slight, it is a distinct possibility. Food would be laid on, too—by the feeding current of the mussel, and the larva could pick what it wanted from the food collected on the bottom edge of the gill before it entered the mussel's mouth. (See fig. 5.) All this without having to live actually in the gut, where it would have to be resistant to digestive juices—one is not surprised that it should have thrived there even though the occurrence was probably only accidental.

J. Green (1044).

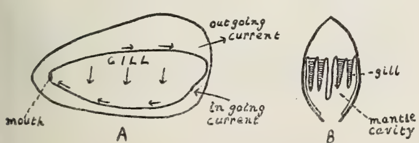

Fig. 5. A shows mussel with one valve and mantle removed. B is a transverse section.

POLYGONIA C-ALBUM LINN.

Some will remember how earlier this century the Comma disappeared for some years, and then (? about 1925-30) re-appeared with a wider distribution than before. Has this ever been explained? And has the following suggestion any justification?

Formerly the hop fields of Kent and of Herefordshire with the bordering counties were regarded as the home ground of the Comma, from whence it spread somewhat spasmodically. Its larva was regarded as a hop feeder with a decided liking for currant. Latterly I have noticed that the best places to expect to find it are the outskirts of woods where there are wych elms, though, especially in autumn, it strays wider afield. Several times I have found it in haunts of *Strymonidia w-album* Knoch. It now has a liking for nettle as well as currant.

I suggest that the Comma of older days was primarily a hop feeder, and that it disappeared through newer methods of hop spraying. Then it re-established itself through immigrants which were primarily elm feeders, dislodged from which they can usually find nettle not far away.

Also I would like to know why (at least within my observation) so few of the July specimens in this latitude are the form *hutchinsonii* Robs.? Generally they differ from September ones in having lighter undersides only. Is the *hutchinsonii* form a southern one?

I shall be equally glad to have my theories proved or disproved so long as fact emerges.

E. S. Lewis (373).

INSECTS IN A DERBYSHIRE COAL MINE

I give below records which include moths, parasites, and a wood-wasp caught in the Ramcroft mine in Derbyshire in 1950.

April 25th. I caught an Ichneumon fly in an airway. It measured half an inch long.

April 28th. I caught another Ichneumon fly, very similar to the one caught on 25th, and in same airway.

May 31st. I caught a Brown Silver Lines Moth (*Lithinea chlorosata*) flying around an electric lamp.

June 2nd. A Pug was found at rest on a piece of wooden bar which was supporting the roof.

June 6th. I found a White Ermine (*Spilosoma lubricipeda*) at rest on side of electric lamp in perfect condition.

June 7th. Another White Ermine caught.

June 8th. Two more White Ermines caught.

June 13th. I found another White Ermine.

June 21st. Still another White Ermine found, making a total of six Ermines caught in same place.

July 23rd. Two Yellow Tails (*Euproctis similis*) and a Mother of Pearl moth (*Notarcha ruralis*) were found at rest.

August 14th. I obtained a Blood Vein (*Calothysanis amata*) at rest.

August 27th. I caught a Wood-wasp which was flying up and down the coal face. This, I believe, would be brought into the pit in its pupal or larval stage in the timber. I have caught five wasps previous to this one, but in another mine, at different times, and years.

W. Bilbrè (1679).
Ramcroft Pit, Palterton, Derbyshire.

IMMIGRANT RECORDS

C. Renfrew (1507) of Larhill, Bourton-on-the-Water, Glos., reports the following captures in 1948, 1949, and 1950:—

Death's Head Hawk Moth (*A. atropos*)—3 pupae at Worcester, 1949; 1 pupa at Burford, Oxon., 1950.

Striped Hawk Moth (*Celerio livornica*)—1 imago at light, Woolacombe, Devon, 23.8.1949; 1 larva (found by boy) at Bourton-on-the-Water, Aug. 1949.

Bordered Sallow (*Heliothis umbra*) —1 imago at light, Bourton-on-the-Water, 9.7.1949; 1 imago at light, Bourton-on-the-Water, 14.7.1949.

Bordered Straw (*H. peltigera*)—1 imago at light, Bourton-on-the-Water, 28.8.1949; 1 imago at light, Bourton-on-the-Water, 5.7.1950.

Scarce Bordered Straw (*H. armigera*)—1 imago at light, Bourton-on-the-Water, 9.9.1950; 1 imago at light, Bourton-on-the-Water, 28.7.1948.

Marbled Clover (*H. dipoacea*)—1 imago at light, Bourton-on-the-Water, 13.7.1950; 1 imago at light, Bourton-on-the-Water, 19.7.1950.

The Gem (*Nycterosea obstipata*)—1 imago at light, Bourton-on-the-Water, 6.5.1950; 1 imago at light, Bourton-on-the-Water, 13.10.1950.

COMMENT

Dr. C. D. Day, the well-known dipterist, refers to a note by Mr E. W. Classey (41), in a review last year, in which he commented that literature on Diptera is "difficult to obtain and costly". Dr. Day is the author of a book on *British Tachinid Flies*, published by Messrs T. Buncle & Co., the printers of this *Bulletin*, at their own risk (Dr. Day gets no financial benefit)—it is advertised on the back of the AES Leaflet No. 5, *Collecting Flies (Diptera)* by E. Parmenter, F.R.E.S. Its cost is 15/-, which, Dr. Day thinks, is not expensive, these days. It has been published specially to help beginners with identification, etc.

REVIEW

Field Book of Beetles by J. R. Dibb; pp. 197, 14 plates of line-figures. Published by A. Brown & Sons Ltd., London, 1948. 21/-.

Mr Dibb introduces a novel angle to the study of British Beetles. Instead of the usual taxonomic approach, his keys are on an ecological basis. The work is divided into five main sections: beetles found on or in soil; those on or attached to plants; those associated with animals and with man; those found in water; and those found at high altitudes. Each of these is sub-divided into "Habitat-Groups," twenty in all, which are in turn divided into their component families and sub-families. Having worked the specimen down to the "Habitat-Group" one has to rely on comparison with line-drawings to determine the family, sub-family or tribe. This seems rather a weak link in the chain of identification.

The drawings by the author are good, but it would be of assistance if the size were indicated by lines of appropriate length instead of figures in mm. beneath each drawing.

The indices at the back include (a) Families, sub-families and tribes. (b) Genera and species, (c) Plants. This last is most useful. The addition of page numbers to the list of "Habitat-Groups" in the front, however, would be of value

Criticising is easy, but the real worth of this work is in its novel method of approach. To the general entomologist's library this book would be a useful addition.

B. L. J. B.

Printed by T. Buncle & Co. Ltd., Arbroath, and published by the Amateur Entomologists' Society, 1 West Ham Lane. London, E.15. 1951.

AES NOTICE
WHERE TO WRITE

Applications for new membership; offers to help with AES work; Exchange Notices to: E. LEWIS, *8 Parry Road, London, S.E.25. (Wants and Exchanges Lists are circulated in March, May, July and October and notices must be received by the 15th of the previous month.)*

Advertisers to: L. W. SIGGS, *10 Repton Road, Orpington, Kent.*

Non-arrival of Bulletins and changes of address should be reported to: B. J. BYERLEY, *48 Elmgrove Road, Harrow, Middlesex.*

Offers to lead Field Meetings, exhibit, etc., to: K. H. BOBE, *19 Hengist Road, London, S.E.12.*

Manuscripts, drawings and books for review to: W. J. B. CROTCH, *5 Stanley Crescent, London, W.11.*

Subscriptions (10/- per annum, 5/- for Juniors) to: P. C. LE MASURIER, *85 Warren Drive, Tolworth, Surrey.*

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EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES
No. 126
BULLETIN
JUNE 1951

ACKNOWLEDGMENT

The Council gratefully acknowledges the first response to Mr Crotch's hint on p. 24—the gift from a donor, who wishes to remain anonymous, of £10 towards the revised edition of *The Silk Moth Rearer's Handbook*.

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THE PROTECTION AND PRESERVATION OF RARE INSECTS

In the case of rare or "showy" insects, it is quite possible by over-collecting to exterminate, or greatly reduce the numbers of a local species. A great many insects inhabit very localized areas and show no sign of extending their range; presumably because of two controlling factors, i.e.: availability of foodplant and suitability of habitat. A third factor, not so widely recognised, is weakness of flying power. When this last factor occurs, ecological conditions must be such that suitable habitats are within the flying range of the insect to allow of any dispersal whatsoever, unless the species is moved on by extraneous means. It will therefore be seen that, in these days of extensive clearance of woods and marginal land for agricultural purposes, and by the utilisation of land for the enormous building programme of to-day, a great number of our species are in danger of total elimination.

It is not wise to interfere too much with natural distribution, for as always, Nature makes her own conditions and will not tolerate interference. It must not, however, be overlooked that desperate conditions demand desperate remedies; and if we, as sincere Nature lovers, wish to conserve our native fauna (and flora), we must give this pressing matter some careful thought.

Under natural conditions it is extremely doubtful if much more than 2% of most Lepidopterous species complete the life cycle. Natural enemies such as weather, birds, rodents, mould, predatory insects and parasites are provided by nature to preserve a balance between them and available food supplies and it can readily be understood how necessary this is, for the progeny of but few generations of plant-eating insects could, if uncontrolled, multiply sufficiently to starve out all terrestrial animal life. Man, prompted by a desire to eat, is doing his utmost to upset the balance of nature—deliberately, as a necessity forced on him by circumstances. We, as Nature lovers must therefore do all we can to preserve those species which are *not harmful* to man's economy.

The establishment of new colonies of Lepidopterous insects is quite feasible, if carefully carried out. It is, however, most necessary to ensure that ecological conditions are as nearly as possible alike in both old and new localities. This experiment can be carried out without in any way interfering with the population numbers in existing habitats, *but should only be carried out under the jurisdiction of a competent body of experts* (see *Bull. 92*, June-July 1948). What I have in mind can have a two-fold application, and I suggest the subject be given consideration by all our members.

Briefly, it is this:—Breed more and collect less. Of all the scarcer insects bred in batches, release at least 5% *in the original locality*. If a desirable insect is getting scarce locally, breed a batch solely for the purpose and release the imagines *where originally collected*. *You* should get 80% of most species through to maturity, against the 2%, or even less, allowed by Nature.

The question of nature preservation is becoming of such urgent importance that we, as a society of Nature lovers, should and can do a great deal to keep our native insects from extinction by such simple methods.

The Ham Street Woods in Kent are just now proving a great magnet to a large assemblage of "Cabinet Collectors". It would be most illuminating to know how many of these enthusiastic collectors are anxious to preserve the existence of the rarities which the Woods contain; or if the alternative is to be total elimination of these beautiful insects from their only known British habitat. A little thought and trouble could firmly establish these rarities at Ham Street

and allow them to be a joy not only to those who so enthusiastically pursue them, but to future generations of Nature lovers, who will also wish to see these grand insects in their natural haunts.

H. E. Hammond (423).

The Editor, AES

30th March 1951

Dear Sir,—We were amazed to see, in Wants and Exchanges List No. 11, March 1951, what we consider to be an outrageous and unethical advertisement by C. B. Antram (1833).

This member apparently proposes to kill the entire nightly captures of his Moth Trap, and to sell them to anyone misguided enough to purchase them, on the offchance that the catch may contain something of value.

It is unnecessary to dilate on the enormity of this astounding proposal; it is bad enough for a member of our Society to suggest killing the contents of his trap, let alone to advertise his conduct for profit. It is still worse that the publication of his advertisement should imply that the Society condones his proposed action.

We are sure that there are many other members whose feelings of horror match our own and who feel, as we do, that our younger members should be shielded against influences of this type.—Yours faithfully,

E. W. Classey, F.R.E.S.,
and
H. S. Robinson, F.R.E.S.

The Editor is able to convey Mr Antram's great regret that a misunderstanding of his intentions has arisen through the undue condensation of his wording. He has given an assurance that he does *not* kill the total takings of his trap and, to make doubly sure that he is understood, has written to those few customers who have responded. He will look out for selected species which they are seeking and will provide a series of up to ten imagines; the remainder will be released, together with all the common species. Mr Antram is distressed that any words of his should have put our Society into bad odour.

The Council now gives notice that it reserves the right to refuse, in future, any advertisement which appears to incite ill-judged collecting.

MANTIDS

The praying mantids are amongst the most fascinating members of the insect world. Although there are no representatives in this country, they can easily be bred here. The simplest to start with is the well-known *Mantis religiosa*, which occurs as far north in France as Fontainebleau. The male and female of this species are shewn in figure 1 at B and D. Other species from the Eastern Mediterranean, Africa and America can also be bred in a warm room without difficulty: for example, that figured by Mr Crotch on p. 21 of the *Bulletin*, Vol. 9, which is *Tenodora sinensis*, introduced from China into the U.S.A.

Mantids are not plant-eaters, but feed on any insects (except ants) that they can catch with their specialised forelegs, the cruel spiked " jackknives " of which are figured at 1A. Despite their diet, they are very cleanly in habit and their cages require practically no cleaning. The refuse collecting at the bottom of the cage will consist chiefly of the uneaten wings of their prey. It will be found that the principal problem in breeding mantids is to supply them with a sufficiency of food. Another is that older mantids must be kept apart; so it is wise to keep only a few at a time. The remainder can quite safely be released in your garden, where they will prove to be real friends to the gardener if the weather is clement enough for them to survive.

Newly-emerged mantids can be kept together safely; a dozen or more being quite happy under a lamp glass with a gauze top. Several twigs should be placed inside. The best food for the first stadium is very small flies. In summer they may usually be caught on any sunny day by sweeping flowers with a fine muslin net. (Ordinary mosquito netting as used in the best butterfly nets is rather too coarse in mesh.) Even greenfly or blackfly (Aphids) will serve at a pinch; but probably the best method of ensuring sufficient food is to maintain a culture of the fruit-fly *Drosophila melanogaster*. (*See the next article*.—Ed.)

After the first moult, not more than three young mantids should be kept together: and after the third moult they should be isolated entirely, unless a very large cage is available. Even in the biggest cages only specimens of equal size should be placed. If this rule is overlooked, the breeder

will arrive one morning and find one very fat mantis occupying the cage that may have housed three thin mantids the night before!

The lamp glass is scarcely suitable for the adult insect; but almost any sizeable cage will do, provided that it is furnished with twigs for the creature to sit on, and is fly-proof (to prevent escapes) and well ventilated.

After their second moult the mantids may be fed on larger prey than fruitflies. Houseflies, bluebottles, crane-flies, beetles, or spiders all make acceptable food. Once through force of circumstances, some mantids had no other food than the Mediterranean Flour Moth (*Ephestia kühniella*) for nearly two months. Full-grown specimens may be fed on very large prey, such as hornets or grasshoppers—and even on *Locusta migratoria*, which is nearly twice their size. Active prey should be given whenever possible, because the mantis has difficulty in noticing anything which sits still. They can be fed with little pieces of meat held in forceps, but it is necessary to make plenty of movement of a teasing kind.

Mating should occur some ten days to a fortnight after the final moult. A pair should be placed in a cage together and kept well fed. Mating may occur at any time of the day or night. After, and sometimes even during copulation, the female eats the male. This is the normal procedure, and the lady may have several unfortunate mates in her lifetime.

The egg-pod (*oötheca*) is generally attached to a twig (see figure at 1C), but sometimes the female chooses a rock in the open or the side of the cage in captivity. The laying is well worth watching. A whitish sticky substance is secreted from the tip of the abdomen and beaten into a froth by two appendages. The tip of the abdomen moves rhythmically up and down the twig and the ova are laid within the froth, which dries out into a straw-coloured papery case about the size of a bullice plum. Miraculously the eggs are in the central area, with strips of overlapping shingle protecting them. In the Spring the young mantids crawl out between the plates and remain for some time attached to the oötheca by silken threads. As many as four hundred may make their appearance from one eggpod.

Do not remove the oötheca from its anchorage if you can possibly avoid it, because damage is almost inevitable

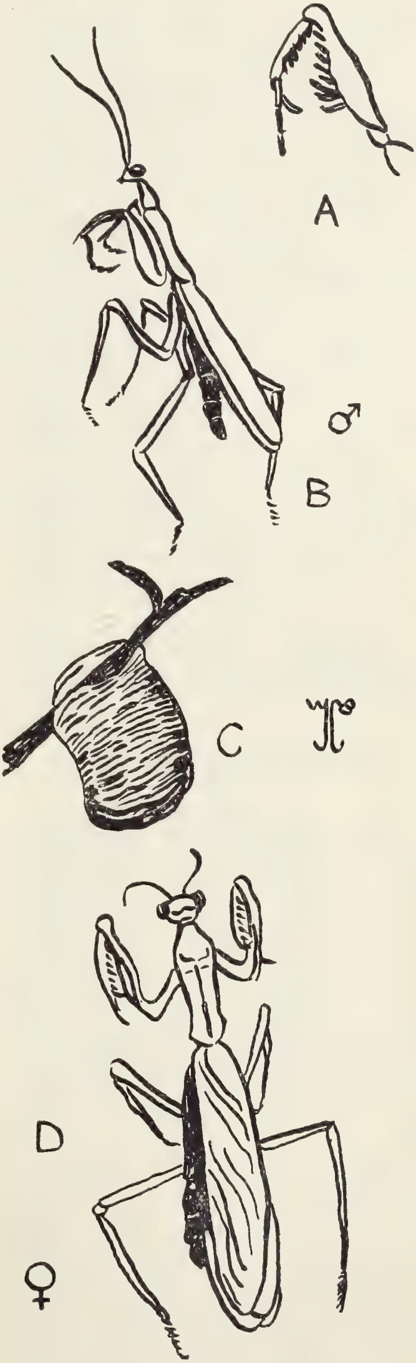

Fig. 1
Mantis religiosa (×$\frac{4}{5}$)

if you do and may prevent the emergence of at least some of the nymphs.

It will be found that the best way of supplying small flies to the young mantids is to use a pooter. Various forms of pooter are described and illustrated in the AES *Hymenopterists' Handbook* (Section reprinted in *AES Leaflet* No. 4). The gauze top of the cage should have a small hole which is stopped with cotton wool. The flies are sucked into the pooter; the bottom tube is then pulled out so that it is level with the cork within; the flies are then blown out again into the cage by inserting the tube into the hole, which is unplugged and rapidly plugged again. Not all the prey will be taken at once; so it is a good plan to place in with the mantids a small piece of sponge which can be soaked in sugar solution or fruit juice for the flies to feed on till their days are ended by *religiosa*. Otherwise they die readily of starvation and your trapping efforts are wasted.

B. O. C. Gardiner (225) and
J. K. Goody (954).

(The Editor has taken the liberty of amalgamating and illustrating two interesting notes submitted independently.)

REARING FRUIT-FLIES AS PREY

While it is desirable to take precautions to standardise the pabulum when rearing *Drosophila melanogaster* for genetic experiments, there is no need to do so if one is rearing fruit-flies merely to feed young mantids or other carnivorous insects.

The simplest method is to take a glass jar with a firmly-fitting metal lid (a honey-jar with clip-on cover serves admirably) and fill up the bottom to the depth of an inch or so with a mash of mixed bran and ripe banana or pear. The mixture must be of a happy medium between wet and dry. It is probably best to start with your mash on the dry side, because within half an hour the full juices will have permeated the bran from the small fruit fragments.

In the lid should be cut two holes. It is easier to make them square than circular, but it is better for the smaller one to be something like a circle. Under or over the larger hole (say $\frac{3}{4}'' \times \frac{3}{4}''$) solder a fine-mesh wire gauze. This hole provides ventilation. The smaller hole should have no dimension greater than the tube of your pooter or commonly used specimen tubes. Except when inserting or extracting flies, you should keep this hole securely plugged with cotton-wool.

To start your breeding, acquire some fruit-flies either by purchase or, from early summer on, by exposing slices of ripe or over-ripe fruit in a sunny position. If you are not good at determining the sexes of these small creatures, use a score or so to ensure that several pairings will be obtained. Imprisoned in the jar, they will keep lively and well-fed for quite a time and their ova will be laid (invisibly from the outside) in the mash. After a week or so, the larvae will be seen wriggling up the sides of the jar where they will pupate in full view of your hand-lens; another and more numerous generation of flies will soon be ready for your mantids.

If you have not constructed a pooter, the flies can very easily be drawn off by using their predilection for light. Remove the wad of cotton wool and quickly invert a specimen tube over the hole. Darken the jar by covering it with one hand while bringing it near one's chest to cut off light from the other side. In no time you will see your tube filling with the flies. Adroit use of the fingers is then necessary to block the tube and slip back the wad in the lid. Your mantid food-supply is now ready for release into their cage: a brown paper "sleeve" slipped over the tube will make them seek the exit in the direction you want. It is a wise precaution to keep going two or three cultures of different ages.

L. C. Bushby (1075).

MATING IN ROVE-BEETLES

In response to Mr H. Last's contribution on this subject (*Bulletin* No. 124, p. 39, April 1951) I can add only a single observation of copulation in Staphylinidae. This was of a pair of *Tachinus rufipes* De Geer at South Norwood sewage farm early in April 1947. They were found beneath a mass of damp twigs and dead grass covering the stump of a pine which had been levelled close to the ground. Unfortunately the specimens are not in my collection, so that I cannot give the exact date. The weather was not cold, but chilly after recent rain, and the sky was overcast.

Dr R. Paulian, in his book *Les Coléoptères—Formes, Moeurs, Rôle*

(Paris, 1943) states that copulation in carnivorous groups, such as Caraboidea and Staphylinidae, is very brief, often lasting only a few minutes, or even seconds. This would be at least a partial explanation of the rarity of observations in the field, as it would be only by the merest chance that specimens would be turned up while mating. Within my limited collecting experience, I do not remember having noticed any of the Geodephaga *in cop.*

E. Lewis (952).

THE GOLDEN EMPEROR AND EDWARDS' ATLAS MOTHS

As a new member of the Society, I was most interested in the excellent account in the January *Bulletin* (No. 121, p. 1) of the breeding of *L. katinka* Westw. by the Southville Boys' Insect Club. I hope that they had the same happy experience as myself, namely the emergence of a second brood of this attractive moth.

With two dozen larvae reared last summer, the time-table was as follows: hatched July 12th (the same day as the Southville Boys' larvae); all but two, given to a friend, spun up between the 14th and 23rd August; all moths emerged in perfect condition between 21st and 29th September. The cocoons were kept in a cool room, they were not sprayed, and there was no heating of any kind in my London flat. Pairings were obtained without difficulty, in spite of the cold weather at the end of September; but for obvious reasons no attempt was made at rearing another brood. The usual time of emergence was between 4 and 6 p.m. The phenomenal growth of the larvae may be due to the discovery, by sheer luck, of an even more acceptable foodplant in the shape of a creeper growing on the wall of my small garden. This had succulent, simple leaves, and although a specimen sent rather late in the day to Mr H. K. Airy Shaw (545) was hardly enough for positive identification, he thinks it is very probably *Parthenocissus tricuspidata*, a native of China and Japan. It is strange that the foodplant has for so long been listed as unknown, as "*Cissus* and *Leea*" are mentioned by Dr K. Jordan in a Seitz article as the foodplants of the allied species *Loepa sikkima*, Moore.

I also found, to my great surprise, that the rearing of larvae of Edwards' Atlas Moth (*Attacus Edwardsii*, White) was far simpler than one is led to suppose from the scanty literature available. The first of a batch of two dozen that hatched on August 13th started spinning five weeks later and, apart from a couple of casualties, all were in cocoon by October 5th. The larvae appear to be polyphytophagous, but feed best perhaps on pear, plum, and privet; oak and willow were not available. There is a marked divergence of opinion concerning the best breeding conditions for this species. In my own case, no artificial heat of any kind was used (this was, in any event, impossible, as our anthracite stove could not be started pending the receipt of spare parts!) and the rate of feeding was not visibly affected by some very cold weather. Short spells of sunshine, however, were appreciated. The larvae at first were kept in cylinder cages; but, later, open breeding was resorted to. Most of them grew to a length of five and a half inches. There is a popular belief that the larva tends to remain for a long time in the cocoon before the final stage, but mine had obviously attained the pupal state within some ten days of spinning. The full-grown larva, with overlapping tubercles half an inch long, is rather grotesque, but an intensely interesting creature.

M. Harrison-Gray (1806).

FIELD MEETINGS

June 27th. Baildon Moor. Bradford Microscopical Society invite AES members to meet at Baildon bus terminus at 7.30 p.m. Bus leaves Chester Street Station at 7.02.

July 15th. Shawford Downs, Hants. Meet Shawford Stn. 2 p.m. Tea at Fisher's Pond Café. Leader: Paul H. Holloway, F.R.E.S., Warwick House, Fairoak, Eastleigh, Hants.

July 25th. Shipley Glen. Bradford M.S. meet at Salts Bridge 7.30 p.m. Trackless tram leaves Forster Sq. at 7.10.

ANNUAL GENERAL MEETING

The Annual General Meeting of the AES was held on Saturday, the 31st March 1951, in the rooms of the Linnean Society, Burlington House, Piccadilly, London, W.1. The attendance of 28 was a very small proportion of the membership. The Officers and Councillors whose names were circulated with the March *Bulletin* were duly elected and the

Council is, therefore, now constituted as follows:—

President: B. L. J. Byerley (788).
Vice-Presidents: W. J. B. Crotch (1181), H. K. Airy Shaw (545).
General Secretary: E. Lewis (952).
Treasurer: P. C. Le Masurier (978).
Meetings Secretary: K. H. Bobe (912).
Publicity Secretary: L. W. Siggs (243).
Youth Secretary: J. A. Dale (1206).
Editor: to be appointed (Mr Crotch acting).
Councillors: Col. A. N. Brangham (18), Messrs B. A. Cooper (19), P. J. Cousins (901), S. M. Hanson (320), C. H. Ison (1343), N. A. Lockington (1421), C. B. Pratt (784), R. G. Shaw (1486), T. R. E. Southwood (1051).

The Council's Report and Treasurer's Statement will be inserted in a later *Bulletin*.

Following the meeting, Mr H. S. Robinson, F.R.E.S. (1518), gave his deservedly reputed lecture on "Light." His theories on the dazzle effect of lights on night-flying insects, the novel construction of traps based on his observations, and the advantages of the use of mercury vapour lamps have already been described in other publications*. A selection of answers to the questions which followed, of which this subject is always prolific, may be of interest.

The proportion of the orders caught is roughly: Diptera 50%, Lepidoptera 35%, other orders 15%, of which last Coleoptera provide a fair number. As many as 20,000 or 25,000 specimens of single species of moth have been caught in one night, when the number of Diptera must have run into millions.

It was suggested that, although such catches might be useful in research on population statistics and in the control of pests, the numbers were far in excess of the needs of the ordinary collector, who could probably afford to dispense with a light trap of a high degree of efficiency, as he had been forced to do in the past. In reply, it was pointed out that a first rate collector could, by ordinary methods, find perhaps 2% of the insect population of a given area, while a moderate estimate of the captures by the light trap would be 75%. It was obvious that in such a large proportion the actual number of rare species would be greater than could be obtained by other means. In practice it was not difficult to pick out even single specimens of unusual species among thousands of common moths. An example was given of where, among a single catch of 25,000 specimens of single species, two albino specimens were noticed, of which only one example had ever before been recorded. It was, therefore, safe to say that a light trap of the type shown was of considerable use to the average collector, but it was no small task to ensure that the thousands of insects captured were allowed to recover from anaesthesis and protected till they could fly away the next evening. It should also be emphasised that rare captures should be retained for breeding rather than to enhance a collection.

E. LEWIS.

*e.g. *Entomologist's Gazette*, Vol. 1, No. 1, 1950.

NOTES AND OBSERVATIONS

C. RENFREW (1507) reports that A. G. Tayler (433) captured a Dusky Sallow (*Eremobia ochroleuca*) at light at Bourton-on-the-Water, on August 4th, 1950.

R. G. HAINES (1545) has noted how few are the records of Butterflies alighting on water. He records such an incident observed by himself last year:—"On August 10th 1950 I was sitting on the bank of the River Plym at Plymbridge, S. Devon, in bright sunshine, when a female Meadow Brown (*Maniola jurtina*) was seen deliberately to alight on the placid surface and float with the current for several yards, with wings still and half-opened. It then rose about a foot in the air, alighted once more, and again floated some yards when it finally flew off as it approached the ripples of a shallow stretch. At no time was it more distant than 30 feet, and though I had a clear view of the whole incident, I am unable to say whether it was drinking."

THE "BLUES" GROUP

Dear Mr Editor,—To follow up on my letter, published in April, may I venture to suggest how the above group should operate. My ideas on the subject agree closely with those of Professor Balfour-Browne, as stated in the March issue of the *Bulletin*, and I propose to send to each member of the group who writes to me a detailed account of observations and recordings to be made, and method of exchanging specimens according to personal requirements.

The group's activities would be:—

1. To record (a) date of emergences of all broods of each species; (b) number of habitats or colonies in each county; (c) variation in numbers from season to season.
2. To exchange specimens to help and encourage the study of geographical distribution.

I shall welcome any other good suggestion that may be put forward for conducting our activities to the greatest advantage of all concerned.

I hope it will be possible in time to recruit keen members from each county in England and Wales and, as far as possible, Scotland and Ireland. I note from the list of members of the Society that most counties are represented.

Results would be summarised from forms provided and published if warranted.

R. C. Dyson (91).

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BREEDING PSYCHIDAE

Perhaps I can throw a little light on some of the points raised in Miss Gibson's interesting contribution to the February *Bulletin*.

First, the larvae of every species of the Psychidae that I have reared do definitely turn head-downwards before pupation. The turning process is amusing to watch, and gives a good idea of the strength and elasticity of the sac-material.

Next, why did one female moth come out? Dr Janse of Pretoria states ("Moths of South Africa" Vol. 1, p. 77) that the ♀♀ of the *Fumeinae*, which have one pair of legs, do come out at intervals; thus differing from the true *Psychinae*, whose ♀♀ can never venture out at all. On one occasion only has a ♀ Psychid of mine ever come out of her case (and finally she fell off it to the bottom of the jar), and then there was no male available. This makes me ask whether it was not possible that one of Miss Gibson's ♀♀ had been fertilised by one of the ♂♂ that had previously emerged, while the other had not. I know that some species are supposed to be parthenogenetic: but I also know from my own experience that the ova of some of them can lie for several weeks before hatching.

The long ovipositor. During the past few years I have devoted considerable time to observation of one very large species of Psychid that is common in Kenya. The ♀ does not appear to have a long ovipositor: at least I have not seen it extended. But since the ova are laid in a large mass of silky fluff that blocks up the "back-door" of the case, and since the ♀ is head-downwards, facing this mass of fluff, it would seem that a long ovipositor, pointing forwards as Miss Gibson describes, might be a most useful instrument. Perhaps it may be of interest to note here that if one of these cases which the larvae have left be split open, there will be found inside it, from top to bottom, first the cast skin of the larva, then the pupa-shell, then the dead ♀ moth, and, finally, the much disarranged mass of fluff through which the larvae have escaped. One would have thought that the larvae would have used this fluff to make their first little cases: but I have never seen this occur. The young larvae come out naked, and immediately spin a communal web of soft white silk over neighbouring twigs, etc. Under the protection of this web they make little conical cases of chewed bark, just long enough to cover the last three abdominal segments. Then they leave the web, and may be seen running about with the cone held vertically upwards—most comical little objects. They do not begin to fasten sticks to the outside of this case until nearly four months have passed, though they spend much time in lengthening the case itself. (This species is very long-lived.)

As for the ichneumon, surely this *must* have been introduced on the food—a terribly easy thing to do, as I know from sad experience. I would not say that the larvae in ova that have been "stung" never hatch out; but in my own experience, never. Such eggs discharge adult parasites that have pupated inside them.

I wonder whether Miss Gibson has had the luck to watch the emergence of the male Psychid. It is an amusing thing. The species to which I have referred is a big one—the sticks covering its case may reach the length of 3½"—so that observation is easy. First, the case begins to oscillate violently. Then the head end of the pupa appears at the orifice, and comes jerkily forward as if it was being propelled from behind. At last the legs appear outside the case (they must have been freed while still inside, and have been doing the propelling), and at this point the orifice of the case seems to contract and grip the abdominal part of the pupa. After this,

the moth has no further difficulty in freeing itself; and the pupa-shell remains half in and half out of the case. The whole life of these creatures is full of interest. I kept one by itself in a large glass jar on my table, and fear I neglected much other work in order to write up its "diary" from March 28th to February 23rd—that is, from hatching to emergence. Its building operations (or tailoring, if you prefer) were completely fascinating, and the strength and (apparent) intelligence that it displayed were amazing.

A. L. H. Townsend (1691).

REVIEW

The Butterflies and Moths (Macro-Lepidoptera and Pyrales) found in the Dover and Deal district of Kent. By Bernard Embry, F.R.E.S., and George H. Youden, F.R.E.S. Foreword, 6 pp.; List of Place Names, 1 p.; Text and Index, 61 pp.; $8\frac{1}{4}'' \times 5\frac{1}{4}''$; boards. Buckland Press, Dover. 1949. Price 5/6.

Once again I have the pleasure of reviewing a local list from my native Kent and, as in Dr Scott's list of the Ashford area, can find little to criticise. The list is well thought out, well produced and printed on excellent paper. Containing, as it does, all *Macro-Lepidoptera* ever recorded in the district, it necessarily contains much of historical interest.

The work of the late Sydney Webb, being fully acknowledged, brings this famous name to the fore. His records, although lacking detail, could not be omitted.

The list contains the names of 597 species of *Macro-Lepidoptera* and 136 species of *Pyrales*. Of the *Macro-Lepidoptera*, no less than 508 species have been seen since 1930. Although no serious attention has been given to the *Micro-Lepidoptera*, about two-thirds of the *Crambidae* and *Pterophoridae* are represented. This is, also, one of the best areas for Immigrant species and the data included makes most interesting reading.

The only criticism I have to make, is, once again, to deplore the absence of Naming Authors. The inclusion of these in the present list would have been particularly useful, as the latest Classification and Nomenclature have been used.

A suggestion to Compilers of lists is that very old records should not be included in the general list, but should be added as an Appendix. In this list a number of 19th Century records are included, and in one case I note the date 1795. For completeness and accuracy these records must be included, but I do feel they should be segregated and not numbered in with species reasonably expected to be found in an area to-day.

To sum up, a work of undeniable interest and usefulness and of much entomological importance, recording, as it does, the *Lepidoptera* of one of our most interesting areas.

H. E. H.

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

MEMBERSHIP LIST

DISTRIBUTION OF 892 MEMBERS IN BRITISH ISLES
THERE ARE 37 MEMBERS OVERSEAS

Compiled and Edited by B. L. J. BYERLEY, F.R.E.S.

AES MEMBERSHIP LIST

JULY 1951

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agric.=agricultural
aq.=aquatic
B.=biology
Bot.=botany
C.=Coleoptera (beetles)
Con.=conchology
D.=Diptera (flies)
Der.=Dermaptera (earwigs)
E.=ecology
econ.=economic
ent.=entomology
esp.=especially
exot.=exotic
fw.=fresh water
gen.=general
Geo.=geology
H.=Hymenoptera (ants, bees, wasps, sawflies, parasites)
Hem.=Hemiptera (bugs)
Het.=Heteroptera (het-bugs)
Hom.=Homoptera (hom-bugs)
L.=Macrolepidoptera (moths and butterflies)
M.=migration
mic.=microscopy
ML.=Microlepidoptera
N.=Neuroptera (mealy wings, lacewings)
NH.=natural history
O.=Odonata (dragonflies)
ornith.=ornithology
Orth.=Orthoptera (roaches, grasshoppers, crickets)
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Curd, O., F.Z.S. (129), Elsinore, Whiston Lane, Prescot, Lancs. (L.)
Currie, J. P. (1932*), 2 Sherwood Gdns., Barking, Essex. (L., C.)
Currie, P. W. E. (977), 102 Burdon Lane, Belmont, Sutton, Surrey. (Orth., H.)
Dale, A., B.Sc. (908), The Knoll, Comberford Lane, Wigginton, Tamworth, Staffs. (Beekeeping, NH., gen. ent.)
Dale, C. H. P. (1838), 113 Hebdon Rd., Tooting S.W.17. (econ. ent., H.)
Dale, J. A. (1206), Copley, Oatlands Close, Weybridge, Surrey. (gen. ent.)
Daley, Rev. F. (1798), St. Cuthbert's Grammar School, Benwell Hill, Newcastle-on-Tyne, 5. (Insect E.)
Dalton, R. F., M.A. (1530), The Dorset County Museum, Dorchester, Dorset. (Museum Display)
Daltry, H. W., F.R.E.S., M.S.B.E. (972), 68 Clifton Rd., Rugby, Warwickshire. (Hem., N., T., ML., C., H.)
Dannreuther, Capt. T., R.N. (60), Windycroft, Hastings, Sussex. (M.)
Darwin Society, The (817†), Shrewsbury School. Com. to Major W. J. Pendlebury, Gyland, Canonbury, Shrewsbury. (L., C., H.)
Davidson, A. R. (575), 2 Foster Rd., Formby, Liverpool. (gen. ent., L.)
Davies, G. M. (1394), Glencarn, Gorsley, Ross-on-Wye, Herefordshire. (C., D.)
Davies, M. J. (760), 31 Kinross Ave., Worcester Park, Surrey. (C. esp. Geodephaga)
Davis, R. V. (1880), 2A School St., Rugby. (L.)
Day, G. V. (29), Furlong Rd., Stoke Ferry, King's Lynn, Norfolk. (L.)

Deacon, C. B. R. (1884*), Hogerty Hill, Linghurst Rd., Woldingham, Surrey. (C., L.)

Deimel, I. R. (410), c/o J. Ingram, Esq., 23 Corby Rd., Mapperley, Nottingham. (L.)

de Mercado, G. I. (1588), Geophysical Observatory, Shetland Isles, Scotland. (D., Thysanura)

Denman, H. F. (1912*), 29 Malpas Drive, Pinner, Middx. (H., gen. ent.)

de Whalley, L. D. (1784*), 45 Devonshire Rd., Bexhill-on-Sea, Sussex. (L.)

de Worms, Baron C., Ph.D., F.R.E.S. (260), 26 Common Close, Horsell, Woking, Surrey. (L.)

Dexter, S. (847), Rosevean, Constantine Bay, nr. Padstow, Cornwall. (gen. ent.)

Dibb, J. R., F.R.E.S. (1195), 30 Plantation Rd., Wollaton, Notts. (C., H., Ephemeroptera)

Dibb, R. A. L. (1688), 255 Beverley Rd., Kirk Ella, E. Yorks. (L., C.)

Dicker, B. E. (1811*), 1291 Christchurch Rd., Iford, Bournemouth. Hants. (L.)

Dixon, G. F. (1809), 63 War Lane, Harborne, Birmingham 17. (D., C.)

Dixon, M. E. (1674*), 18 Kingsholm Square, Gloucester. (L.)

Dolton, H. L. (1122), 36 Chester St., Reading. (L.)

Dorrington, B. G. (1593), 19 Bryn Drive, South Reddish, Stockport, Cheshire. (aq. ent., H., Z., mic., Bot.)

Downing, F. S. (1772), Castlehill House, Kingsley, nr. Frodsham, Cheshire. (C.)

Downing, M. F. (1878*), White Lodge, West Pennard, Glastonbury, Som. (L.)

Duke, A. J. H. (97), 17 St. Bedes Rd., Three Anchor Bay, Cape Town, S. Africa. (L.)

Duncan, S. (280), 43 Wilson St., Anlaby, Yorks. (L.)

Dunkin, D. K. (1487), 69 Carnarvon St., Netherfield, Notts. (L.)

Dunn, T. C. (1845), The Poplars, Chester-le-Street, Co. Durham. (L.)

Durham, J. (1174), 62 Reigate Rd., Brighton 5, Sussex. (NH.)

Durrant, K. C. (1375), The Hollies, Theatre St., E. Dereham, Norfolk. (gen. ent., esp. D.)

Durrant, W. J. (1196), 64 Pine Gardens, Surbiton, Surrey. (D., O., C.)

Dutton, B. V. F. (1687*), 43 Bosworth Rd., New Barnet, Herts. (L.)

Dyce, J. W. (1602), Hilltop, 46 Sedley Rise, Loughton, Essex. (L.)

Dyson, R. C., N.D.H., F.R.E.S. (91), 112 Hollingbury Park Ave., Brighton 6, Sussex. (L., foodplants)

Eade, G. T. (190), 3 Rutland Rd., Hove 3, Sussex.

Eagles, T. R. (194), 32 Abbey Rd., Enfield, Middx. (L.)

Earl, B. C. A. (1388), 2 South Park, Loose Rd., Maidstone, Kent. (L.)

Eberlie, W. J. D. (70), Brooke House, Crawley Green Rd., Luton, Beds. (L., O.)

Edelsten, H. M., F.R.E.S. (208), Bramble Hill, Balcombe, Sussex. (L.)

Edwards, J., B.Sc. (844), 81 Hassam Parade, Newcastle, Staffs. (O., D.)

Edwards, R. C. (949), Arlesey, Pilgrim's Way, Westerham, Kent. (gen. ent.)

Edwards, Canon T. G., M.A., F.Z.S. (754), Holy Trinity Vicarage, London S.W.2. (gen. ent. esp. L.)

Eley, R. (1201), c/o Mr. Ruddock, Hall Cottages, Nowton, nr. Bury St. Edmunds, Suffolk. (L. Heterocera)

Ellison, W. M. (1318), 40b Victoria Rd., Scarborough, Yorks. (L.)

Emery, R. J. R. (1844*), 3 Hillsborough Park Rd., Ilfracombe, Devon. (L.)

Emmet, A. M., M.B.E., M.A. (1379), St. Edward's School, Oxford. (L.)

Ennion, Dr. E. A. R. (1854), Monks' House, Seahouses, Northumberland. (gen. ent., H.)

Ensor, P. C. (891), 26 Webb Lane, Hall Green, Birmingham 28. (L.)

Entrican, Miss M. C. (764), Channing School, Highgate, London N.6. (L.)

Esslemont, I. (775), 16 Westfield Terrace, Aberdeen. (Mosquitoes, aq. C., O.)

Evans, G. C. (1788), 159 North Walsham Rd., Old Catton, Norwich, Norfolk.

Evans, J. J. T. (1576*), Mill Field, Mill Lane, Chalfont St. Giles, Bucks. (L.)

Evans, J. O. (1840), 35 Maesygarreg, Cefn Coed, Merthyr Tydfil, S. Wales. (L., C., fw. gen.)

Ewart, A. (1861*), 48 Longton Grove, Sydenham, S.E.26. (L.)

Ewing, A. W. (1731*), 14 Hamilton Terrace, Portobello, Midlothian. (ML.)

Ewing, K. W. (1121), Castleway, Calne, Wilts. (L. esp. breeding)
Exmouth Training College (1643†), Rolle Rd., Exmouth. Com. to Mrs. Leadley-Brown. (L.)
Farley, K. (1813*), Lashenden Villa, Biddenden, Kent. (C., experimental ent.)
Farwell, I. G. (1445), Mayfield Villa, Portmore, Lymington, Hants. (L.)
Fearnhough, T. D. (47), 13 Salisbury Rd., Dronfield, Derbyshire.
Featherstone, C. (1490), Rhode Common, Dunkirk, nr. Faversham, Kent. (gen. ent.)
Fenn, J. L. (1665), "Fernleigh", Oxborough Rd., Stoke Ferry, nr. King's Lynn, Norfolk. (L.)
Ferguson, E. A. (1311), 1213 Bellflower Ave. S.W., Canton 4, Ohio, U.S.A. (L.)
Ferneley, W. H. (1540), Frogs Hall, Waltham, nr. Canterbury, Kent.
Fidler, Dr. J. H. (1256), Ministry of Agriculture and Fisheries, University College of South Wales and Mon., Cathay's Park, Cardiff. (T., Hem. esp. Aphididae)
Field Club, The (1882†), Grammar School, Houghton - le - Spring. Com. to G. F. W. Hart. (gen. ent.)
Field Club, The (822†), R.N. College, Dartmouth, Devon. Com. to N. R. Hall, Hon. Sec.
Field, G. N. (1000), 14 Mitchley Grove, Sanderstead, Surrey. (L.)
Finlay, J. F. (806), The Gables, Honiton, Devon. (L.)
Finlay, Capt. R. A. L., M.B.E. (229), 9 Hermitage Gdns., Edinburgh 10. (gen. ent.)
Firth, J. Digby, F.S.A. (1210), 347 Otley Rd., Leeds 6. (gen. ent.)
Fisher, J. M. (1305), Old Rectory, Ashton, Northampton. (L.)
Flello, F. E. C. (1587), 23 Church St., Buckingham. (L.)
Floyd, C. G. (1764), "Jupiter", Dodwell, Stratford-on-Avon, Warwickshire. (L.)
Fluck, G. G. (569), Redroof, Reading Rd., Fleet, Hants. (L.)
Ford, Rev. G. A. (377), Balsham Rectory, Balsham, Cambs. (L.)
Ford, T. H. (1642), 275 Derbyshire Lane, Sheffield 8. (L.)
Fordham, P. J. (1808*), 15 Edward Close, Gidea Park, Essex. (O., L., C., Arachnida)
Foss, P. W. (1620), 15 Court Road, South Norwood, London S.E.25. (L.).
Fountain, H. G. (1498), 116 Ralph Rd., Birmingham 8. (L.)
Fox, K. J. (1459*), 20 Scotsdale Rd., London S.E.12. (L.)
Fox, T. H. (105), 226 St. Albans Rd., Watford, Herts. (L., breeding)
Fraser, Lt.-Col. F. C., I.M.S. Retd. (890), 55 Glenferness Ave., Winton, Bournemouth, Hants. (O., N., Orth.)
Fray, E. A. (1628), "Merry Gardens", Chapel Rd., West End, Southampton, Hants. (L.)
Freeman, John A., Ph.D. (986), 5 Woodmere Way, Beckenham, Kent. (Stored Products ent.)
Gamble, Miss W. (1127), 21 Albert Crescent, Bury St. Edmunds, Suffolk. (gen. ent.)
Gardiner, B. O. C. (225), 34a Storeys Way, Cambridge. (L., gen. ent., N.)
Garraway, G. J. (1826*), 45 Albert Rd., Coleford, Glos. (L., ML.)
Garrett-Jones, C. (989), Iken Hall, Woodbridge, Suffolk. (L., D.)
Gay, P. A. (1393), School House, Hartbury, Glos. (L., C., D., H.)
Gaze, W. E. (1812), 33 Beridge Rd., Halstead, Essex. (L.)
Gent, P. J. (192), 3 Union Rd., Wellingborough, Northants. (L.)
George, R. S. (1402), Flat 1, 46 Northgate St., Gloucester. (B., Bryology)
Gerard, Hon. R. (359), Blakesware, Ware, Herts. (L.)
Gibbs, G. W. (1212*), Tree Tops, Muritai Rd., Eastbourne, Wellington, New Zealand. (gen. ent.)
Gibson, Miss E. M. (311), St. Cuthberts, King George Ave., Petersfield, Hants. (L.)
Gilbert, A. E. H. (1631), 5 The Avenue, Hatch End, Middx. (L.)
Gilbert, O. L. (1634*), 46 Round Wood Park, Harpenden, Herts. (L.)
Gilson, J. R. (1529), Burrough on the Hill, Melton Mowbray, Leicester. (L., H.)
Gilvary, R. B. (1917*), 49 Hartland Drive, Ruislip, Middx. (L.)
Gittens, J. H., F.C.A. (1799), 8 The Green, Richmond, Surrey. (aq. ent.)
Gobbett, D. J. (1839*), 6 Ramsden Drive, Collier Row, Romford, Essex. (L.)
Goddard, L. (1801), Dirry Mor, Wrens Rd., Borden, Sittingbourne, Kent. (agric. pests, H.)
Goddard, P. F. (1881*), 8 Calverley Rd., Stoneleigh, Ewell, Surrey. (L.)
Goddard, T. D., F.R.E.S. (841), Long Hoyle Farm, Heyshott, Midhurst, Sussex. (L.)
Golby, W. A. (1412), 136 Milner Rd., Birmingham 29. (gen. ent.)

Golding, D. P. (904), 517 Foots Cray Rd., London S.E.9. (L.)
Goodall, Miss M. D. (807), 47 Stratford Ave., Ryhope Rd., Sunderland, Co. Durham. (L., aq. ent., garden pests)
Goodbody, G. (1470), 284 Baring Rd., London S.E.12. (L.)
Goodman, A. de B. (920), 20 Brooklands Ave., Cambridge. (gen. ent.)
Goodson, A. L. (241), 26 Park Rd., Tring, Herts. (L.)
Goodwin, R. J. C. (1551), The Elms, Chislehurst Rd., Sidcup, Kent. (L.)
Gorer, Dr. P. A. (676), 3 Fairway Close, Wildwood Rd., London N.W.11. (L. genetics and local variation)
Gorer, R. (659), Little Pett Farm, Bridge, nr. Canterbury, Kent. (L.)
Gough, Miss F. M. (1786), 42 Rocky Lane, Broad Green, Liverpool 16. (gen. ent.)
Goulding, D. (1291), 81 New St., New Mills, nr. Stockport, Cheshire. (gen. ent. esp. L.)
Gowing-Scopes, E. (909), Oakhurst, Oakwood Rd., Crofton, Orpington, Kent. (L., C.)
Graham, E. W. (1142), Windy Ridge, Little Widbury, Ware, Herts. (L.)
Grant, F. T. (276), 37 Old Rd. West, Gravesend, Kent. (C., L.)
Grattan, Miss S. E. G. (1581), 9 Wolverton Ave., Kingston Hill, Surrey. (L.)
Graves, P. P. (1831), Ballylickey House Hotel, Bantry, Co. Cork, Eire. (L., O., Orth.)
Gray, G. D. (1645*), Richmond Lodge, College Hill, Jersey, Channel Isles. (L., C., H., O.)
Gray, W. J., M.R.C.V.S., F.R.E.S. (1843), c/o H. Warland, Esq., 38 Winsford Terrace, Great Cambridge Rd., London N.18. (L., D.)
Green, J. (1044), 61 Ruskin Rd., Crewe, Cheshire. (C., gen. ent.)
Greenford County School N.H. Society (892†), Ruislip Rd., Greenford, Middx.
Greenhill, J. S. (1883), 7 Barnett Wood Lane, Ashtead, Surrey. (L.)
Greenwood, R. S. (757), 22 Maidstone Rd., Rochester, Kent. (L.)
Gregson, Miss A. (1711), Wynyard Hall Training College, Wolveston, nr. Billingham, Co. Durham. (gen. ent.)
Griffin, Mrs. E. M. (1637), 1 Park Hall, Crooms Hill, London S.E. 10. (gen. ent.)
Griffiths, G. (1217), Adwy Goch, Blaenau Festiniog, Merionethshire. (gen. ent., parasites)
Grimwood, K. W. (1625), 20 Lancing Rd., Newbury Park, Ilford, Essex. (L.)
Gripper, A. G. (1836), 82 Shaftesbury Ave., London W.1. (L. esp. Sphingidae)
Groves, E. W. (1792), 143 Carshalton Park Rd., Carshalton, Surrey. (gen. ent.)
Guile, C. T. (1752), 51 Coity Rd., Bridgend, Glamorgan. (parasitic orders)
Gully, R. G. (1797), 146 Beckenham Rd., Beckenham, Kent. (L., Sphingidae)
Haggett, G. M. (1200), 1 Torton Hill, Arundel, Sussex. (L., gen. ent.)
Hague, N. G. (943), 39 Heath Drive, Potters Bar, Middx. (L., O.)
Halkier, W. W. L. (1829), "Arnprior", Thorp Ave., Morpeth, Northumberland. (gen. ent.)
Hall, David W. (1088), Zoology Dept., University College, Dundee. (gen. ent.)
Hall, Rev. J. H. V. (1520), St. Peter's Vicarage, Kells, Whitehaven, Cumberland. (L.)
Halstead, T. K. (1910*), 11 Tudor Grove, Sunderland, Co. Durham. (L.)
Ham, B. J. (1327), "Mona", Kings Saltern Rd., Lymington, Hants. (L.)
Hamar, C. E. (1700), 7 Addison Square, Dinnington, Sheffield, Yorks. (Silkmoths).
Hamlyn, E. T. (1923), 8 Kingsley Rd., Plymouth, Devon. (gen. ent.)
Hammond, D. (1846), Kingsview, Bladon, Oxon. (C., gen. ent.)
Hammond, H. E., F.R.E.S. (423), 16 Elton Grove, Birmingham 27. (L., ML., C., gen. ent.)
Hanlon, G. T. (504), 5 Carlisle Gdns., Ilford, Essex. (L.)
Hanson, A. R. (1500), 167 Gunnersbury Park, Pope's Lane, W.5. (L., gen. ent.)
Hanson, M. K. (1653), 95 Mere Rd., Leicester. (L., Insect Classification)
Hanson, P. D. (1889), Shore Edge Cottage, West Quantoxhead, nr. Taunton, Somerset. (L.)
Hanson, S. M. (320), 167 Gunnersbury Park, Pope's Lane, W.5. (L.)
Harding, C. J., B.Sc. (894), BM/NEWT, London W.C.1. (B.)

Harding, J. G. R. (1669*), 37 Chestnut Ave., Withernsea, E. Yorks. (L.)

Hardman, J. A. (1234), 10 Hands Lane, Bury Rd., Rochdale, Lancs. (gen. ent., L., ML., NH., Bot., ornith.)

Hards, C. H. (176), 40 Riverdale Rd., London S.E. 18. (L., mic.)

Harle, D. F. (889), "The Studio", Strand St., Sandwich, Kent. (E.)

Harman, I. (1594), 150 Hither Green Lane, London S.E.13. (L.)

Harper, Comdr. G. W., R.N. (1169), Bramblewood, Bushby Ave., Rustington, Sussex. (L., gen. ent.)

Harper, M. W. (1553*), Bramblewood, Bushby Ave., Rustington, Sussex. (L., gen. ent.)

Harris, K. C. (1791), 2 The Close, North View, Eastcote, Pinner, Middx. (gen. ent.)

Harrison, D. G. (1689), 125 Mawson Rd., Cambridge. (gen. ent. esp. R.)

Harrison, E. (1676), 53 Borrowdale Rd., Lancaster. (L.)

Harrison, Prof. J. W. Heslop, D.Sc., F.R.S., F.R.E.S. (716), Gavarnie, The Avenue, Birtley, Co. Durham. (gen. ent., L., Biogeography)

Harrison-Gray, M. (1806), 36 Eton Avenue Garage, Lancaster Grove, London N.W.3. (Saturniidae)

Hart, B. H. (1816), 94 Ramsey Rd. North, Dovercourt. Essex. (H.)

Hartley, P. H. T., M.A. (1899), Flatford Mill Field Centre, East Bergholt, nr. Colchester, Essex. (E.)

Harwood, N. W. (825), 37 Stoneyhurst Ave., Acklam, Middlesbrough, Yorks. (L., P.)

Harwood, P. (273), Ardinsh, Kincraig, Inverness-shire. (C., Hem., Hom., H., Aculeata)

Hashimoto, I. (1661), 2162, 2, Nishiichinoe, Edogawaku, Tokio, Japan. (L., C.)

Hatcher, F. L. (1441), 18 St. Edmunds Drive, Stanmore, Middx. (L., D.)

Hawdon, A. S., B.Sc. (1469), 47 Keslake Rd., London N.W.6. (L.)

Haxby, C. R. (1508), 4 Windermere Terrace, Great Horton, Bradford, Yorks. (L.)

Haynes, R. F. (834), 132 Fairfield Drive, Dorking, Surrey. (L., gen. ent., Bot.)

Haynes, R. G. (1545), 5 Lucas Terrace, Lucas Lane, Plympton, Plymouth, Devon. (L.)

Haywood, N. (1924), 100 London Rd., Sleaford, Lincs. (L.)

Heaford, P. E. (1695), Science Lecturer, Culham College, Abingdon, Berks. (gen. ent.)

Heaman, J. C. (1430), Gulland, Dulverton, Somerset. (L.)

Heard, M. J. (595), 65 Park Side, Didcot, Berks. (L. esp. Genetics)

Heley, R. G. (731), Lygoes, Burcott, Wing, Leighton Buzzard, Beds. (L., Bot.)

Hellings, G. E. A. (297), 49 Wheatsheaf Close, Woking, Surrey. (L.)

Henderson, C. W. (21), 150 Knightthorpe Rd., Loughborough, Leicestershire. (C., Brit. and exot.)

Henshaw, E. J., B.Sc. (692), 58 Berwyn Grove, Maidstone, Kent. (L., horticultural ent.)

Henstock, Dr. H., Ph.D., M.Sc., F.I.C. (209), Glengariff, Caerwys, Mold, Flint. (L.)

Heppell, D. H. (1690), 3 Jacomb Place, Bridgemary, Gosport, Hants. (L.)

Heslop, Miss V. L. M. (835), Villa Aïce-choko, Route des Dunes, St. Jean-de-Luz (B.P.), France. (agric. insect pests, C.)

Hesselbarth, G. (1761), (23) Diepholz/Hann, Hindenburgstrasse 13, Germany. (L.)

Hewson, F. (601), 23 Thornhill Drive, Shipley, Bradford, Yorks. (L.)

Hick, A. E. (567), Sherrards, Cricket Field Lane, Bishop's Stortford, Herts. (O., H.)

Hill, A. R., B.Sc., Ph.D., F.R.E.S. (1043), Kinnaird Cottage, 30a Drymen Rd., Bearsden, Dunbartonshire. (E. esp. aq., Hem.)

Hill, R. J. (1505), 31 Holland Rd., Luton, Beds. (L.)

Hillaby, J. D., F.Z.S., F.R.E.S. (1492), 85 Chomley Gdns., London N.W.6.

Hilliard, R. (99), 54 Gyles Park, Stanmore, Middx. (L., NH.)

Hillton, G. W. (1702), 108 Tattersall Gdns., Leigh-on-Sea, Essex. (L.)

Hincks, W. D., M.P.S., F.R.E.S., (531), 19 Whitefield, Heaton Norris, Stockport, Cheshire. (gen. ent., C., Orth., Der., nomenclature)

Hirons, M. J. (444), 41 Kelvin Ave., Wyken, Coventry, Warwickshire. (L., mic.)

Hitchens, P. E. N. (669), Sicklebank, Horam, Sussex. (L. esp. temperature trials on pupae)

Hobbs, C. R. (1850*), 135 Doncaster Rd., Southmead, Bristol.

Hobday, C. A. (1538), The Hollies, Wilsthorpe Rd., Breaston, Derbyshire. (L., C.)

Hodge, W. F. (1719), Holly Villas, Cranbrook Rd., Goudhurst, Kent. (L.)
Hodges, G. B. (314), 12 London Rd., Braintree, Essex. (L.)
Hodge, W. H. (878), 28 Mortlock Ave., Chesterton, Cambridge. (L.)
Hodgson, F. L. (580), 9 Ennerdale Drive, Bolton, Bradford, Yorks. (L.)
Hodson, E. V. (1392), 19 Stamford Rd., West Bridgford, Nottingham. (L.)
Hodson, L. S. (851), "Littlestowe", Essendon, Herts. (gen. ent.)
Hollander, T. (1776*), Gidleigh Lodge, Chagford, Devon. (L.)
Holloway, P. H., F.R.E.S. (429), Warwick House, Fair Oak, Eastleigh, Hants. (R.)
Holroyd, G. C. (253), 8 Elmside, Onslow Village, Guildford, Surrey. (L.)
Homewood, C. T. H. (1873), Cartref, High St., Aylesford, Kent. (L.)
Honeybourne, T. J. (1558), 97 Birchwood Rd., Wilmington, Dartford, Kent. (L.)
Hood, L. A. (526), Orchard Cottage, Tolleshunt Major, Essex. (L.)
Hookham, R. E., F.V.A., F.R.H.S. (1712), 40 St. John St., Oxford. (gen. ent.)
Hope Professor, The (666), Hope Department of Entomology, University Museum, Oxford. (Bionomics)
Hopkins, Miss B. A. (827), 43 Hainton Ave., Grimsby, Lincs. (L., breeding)
Horner, L. B. (917), 66 Balckaw St., Guisborough, Yorks. (gen. ent.)
Horsley, H. P. (1624*), 40 Bath St., Ipswich, Suffolk. (C., L.)
Horton-Ormerod, S. (1370), 17 Kenwood Rd., Moss Bank Park, Bolton, Lancs. (Arachnology)
House, D. N. (1656), 80 Osborne Rd., Portswood, Southampton, Hants. (L.)
Howarth, T. G., B.E.M., F.R.E.S., F.Z.S. (1627), Dept. of Entomology, British Museum (Nat. History), Cromwell Rd., S.W.7. (L.)
Humphrey, S. W. (386), Pear Tree House, Roade, Northants. (R.)
Hunking-Molyneux, W. (1297), Greenhill, Afonwen, Caerwys, Flintshire. (gen. ent.)
Hunt, F. H. (1730), 41 Granada Rd., Southsea. (L.)
Hunter, F. A. (1872), 13 Clare St., Cambridge. (gen. ent.)
Hurrell, F. J. (923), 46 Goldlay Ave., Chelmsford, Essex. (L.)
Hurst, A. (1618), The Garage, Guildford Rd., Cranleigh, Surrey. (L.)
Hutchison, Flt/Lt. D. (919), 246 Muirhall Rd., Larbert, Stirlingshire. (World R. esp. Brit. and European)
Hyatt, K. H. (1411), 3 Kidbrooke Gdns., Blackheath, S.E.3. (L.)
Hyde, G. E., F.R.E.S. (818), 20 Woodhouse Rd., Doncaster, Yorks. (L., O., H.)
Hyde-Wyatt, B. (1548), 108 Lindsay Rd., Worcester Park, Surrey. (gen. ent., O., L., H.)
Hynes, Mrs. V. D. P. (686), 152 Meachem Ave., Battle Creek, Michigan, U.S.A. (Silkmoths)
Ika, Miss N. O. (1423*), c/o Miss A. O. Ika, C.T.C. Mamfe, British Cameroons.
Ilse, Dr. D. (1575), c/o Dr. M. Redlich, 70 Sheldonfield Rd., Birmingham 26. (L., D., *Eristalis*)
Innes, Miss S. (1663*), Learney, Torphins, Aberdeenshire. (L.)
Ireland, M. (1526*), 72 Days Rd., Bristol 5. (gen. ent.)
Irwin, Roderick R. (1220), 411 North Bloomington St., Streator, Illinois, U.S.A. (R.)
Ison, C. H. (1343), 47 Orford Rd., London E.17. (gen. ent. esp. Saturniidae, mic., P.)
Jackson, Miss Dorothy J., F.L.S., F.R.E.S. (1124), North Cliff, St. Andrews, Fife. (gen. ent., C., H.)
Jackson, S. M. (1269), 15 Westbourne Rd., Selby, Yorks. (L.)
James, R. T. H. (626), Grove Cottage, Chute Cadley, Andover, Hants. (gen. ent., ornith.)
James, W. H. (120), 6 Westlands Court, Dorking Road, Epsom, Surrey. (L. esp. R., Sphingidae)
Janes, C. T. (1635), 151 Warwick Rd., Edmonton, London N.18. (gen. ent.)
Janes, J. A. (614), 1 Ailsa Terrace, Tiverton, Devon. (L.)
Jaques, F. A. (1314), 58 Clifton Gdns., London N.W.10. (gen. ent., P.)
Jarvis, C. MacKechnie, F.L.S. (650), 21 Spenser Rd., Harpenden, Herts. (C., econ. ent.)
Jefferson, T. W. (242), 37 Riversdale Terrace, Sunderland, Co. Durham. (R.)
Jeffreys, Dr. D. M., M.B., B.Ch. (615), 116 Hurst Grove, Bedford. (L., ornith., gen. ent.)
Jeffs, G. A. T. (910), Nuns Holm, Nuns Corner, Grimsby, Lincs. (gen. ent.)
Jeremy, Dr. W. H. R. (1778), 38 Barnfield Rd., Exeter. (C.)
Jesper, D. M. (1152), 23 Woodlands Grove, Harrogate, Yorks. (L., C., H., Beekeeping)

Johnson, Miss B. I. (1895*), 7 Villa Rd., Cheddleton, nr. Leek, Staffs. (L.)

Johnson, J. H. (1040), 53 Knighton St., Hepthorne Lane, nr. Chesterfield, Derbyshire. (C., H.)

Jones, A. V. (1633), "Hafod", Lower Cardiff Rd., Pwllheli, N. Wales. (C.)

Jones, A. W. (1165), 99 Ashmore Rd., London W.9. (D.)

Jones, E. (1699), 28 Guildford Ave., Gillshill Rd., Hull. (gen. ent., ornith., P., mic.)

Keen, W. E. (1743), 67 St Julians Rd., Newport, Mon. (Arachnida)

Keji, J. A. (571), Biggs Memorial Hospital, Ithaca, N.Y., U.S.A. (L. larvae, esp. Saturniidae, Notodontidae, Eucleidae)

Kemp, J. H. (1161), 104 Oxstalls Lane, Gloucester. (aq. ent.)

Kennington, F. E. (1549), Lodge Farm, Benningholme Lane, Skirlaugh, nr. Hull, Yorks. (D., C., gen. ent.)

Kennard, A. H. (1698), 11 Marton Rd., Long Itchington, nr. Rugby, Warwickshire. (L., H.)

Kennard, H. A. (1871*), Torns, Ashburton, S. Devon. (L.)

Kennedy, A. (20), 130 Vesper Rd., Leeds 5, Yorks. (L.)

Kerr, M. A., M.B.E. (1609), Olinda, Golf Links Rd., Ferndown, Wimborne, Dorset. (L.)

Kerrich, G. J., M.A., F.R.E.S. (551), Heath Crest, Westcott, Dorking, Surrey. (H., Parasitica)

Kettlewell, Dr. H. B. D., M.A., M.B., B.Chir., M.R.C.S., L.R.C.P., F.R.E.S. (706), Homefield, The Common, Cranleigh, Surrey.

Keyes, J. B. (1603*), 11 Gunners Grove, Chingford, E.4. (L.)

Keylock, J. G. (471), 34 East St., Crewkerne, Som. (D., aq. ent.)

Kindred, A. D. (1707*), 27 Richmond Ave., East Bedfont, Middx. (L.)

Kloet, G. S., F.Z.S., F.R.E.S. (477), 14 Hawthorn Lane, Wilmslow, Cheshire. (gen. ent., nomenclature)

Knight, A. (1732*), 9 Jordans Close, Leavesden, nr. Watford, Herts. (L.)

Knight, J. E. (94), Doughton Cottage, Ross-on-Wye, Herefordshire. (L. rearing)

Knight, Major Maxwell, O.B.E., F.R.M.S., F.L.S. (956), The Homestead, Park Rd., Camberley. (aq. ent., moths, mic.)

Koerber, T. (1710), 1267 N. 24 P.L., Milwaukee 5, Wisconsin, U.S.A. (L.)

Krauss, N. L. H. (1471), 2437 Parker Place, Honolulu 5, Hawaii. (Trypetidae)

Lamb, D. F. (1915*), 3 Queensthorpe Rd., Sydenham, London S.E.26. (L.)

Lane, A. W. (1744*), 178 Ravenscourt Rd., Beckenham, Kent. (L., C.)

Lanfear, A. H. (74), 20 South Eastern Rd., Ramsgate, Kent. (L.)

Langford, P. G. (1630), Moordown, 7 London Rd., Widley, Portsmouth. (L.)

Last, H. R. (117), 12 Winkworth Rd., Banstead, Surrey. (C., esp. Brit. and foreign Staphylinidae)

Latham, J. W. (1574), 51 Park Drive, Grange Park, London N.21. (Orth., O., L.)

La Touche, Dr. A. A. D. (884), 21 Alwoodley Gardens, Moortown, Leeds, Yorks. (Arachnida)

Le Clercq, Dr. J. (1055), Laboratoires de Biochimie de l'Université de Liége, 17 Place Delcour, Liége, Belgium. (physiological ent., H.)

Leeds, H. A. (282), Wood Walton, Hunts. (L. esp. R. vars.)

Lees, F. H. (375), The Gables, Maidencombe, Torquay, S. Devon. (L.)

Lees, J. A. G. (1779*), 37 Gawber Rd., Barnsley, Yorks. (L.)

Lees, P. (1859*), 35 Manchester St., Oldham, Lancs. (P. of L. larvae)

Le Masurier, P. C. (978), 85 Warren Drive, Tolworth, Surrey. (L.)

Leonard, B. E. (1708*), 28 Brownhill Rd., Chandler's Ford, Eastleigh, Hants. (L.)

Leonard, B. G. (96), 29 Storeton Rd., Oxton, Birkenhead, Cheshire. (L. Sphingidae)

Leonard, B. W. (1920*), 22537382 Bandboy, Band of Royal Corps of Signals, att. 7 Selection Regiment, Catterick Camp, Yorks. (L.)

Leppard, P. J. (1869*), 39 Moffat Court, Wimbledon S.W.19. (L., O.)

Leston, D., F.R.E.S., F.Z.S. (1589), 44 Abbey Rd., London N.W. 8. (Het.)

Levett, R. J. R. (1867), Netheroak, Stockcroft Rd., Balcombe, Sussex. (L., O.)

Levy, Miss F. F. (1847*), 55 Queenborough Rd., Halfway, Isle of Sheppey, Kent.

Lewis, E. (952), 8 Parry Rd., London S.E.25. (C.)

Lewis, Rev. E. S. (373), Berwyn, Rhuddlan, Flintshire. (L.)
Lewis, R. (734), Sandynook, 2 Cheverton Avenue, Withernsea, Yorks. (O., Bot.)
Liddell, Lady H. G. (1531), Manor House, Finchampstead, Berks. (Midges, Pond Life)
Ling, R. B. (1885), 6 Old Forge Way, Sidcup, Kent. (L.)
Lisney, Dr. A. A., M.A., M.D., F.R.E.S. (315), Dune Gate, Clarence Rd., Dorchester, Dorset. (L., ML.)
Little, E R. B. (1546*), 59 Lockesley Drive, St. Mary Cray, Orpington, Kent. (L.)
Little, J. C. (563), 70 Longley Way, West Wickham, Kent. (L. including exot.)
Lloyd, Major C. T., D.Sc., Ph.D. (468), 25 Belmont Ave., New Malden, Surrey. (L., ML., microphotography, ornith.)
Lloyd, L. C., F.L.S., M.B.O.U. (770), Shackerley, Wenlock Rd., Shrewsbury, Shropshire. (E.)
Lloyd, R. W. (445), The Grange, Bampton, Oxford. (C.)
Lobb, J. (1608), Fernbank, Yarborough Rd., Wroxall, I. of Wight. (gen. ent.)
Locke, M. (1118), 36 Ainsdale Rd., London W.5. (L., Bot., Mic., Z.)
Lockington, N. A. (1421), 24 Beaufort Gardens, London N.W.4. (C., H.)
Long, Miss L. M. (698), White Horse Farm, Somerleyton, via Lowestoft, Suffolk. (L. rearing, gen. ent.)
Long, W. H. (1565), Ashleigh, Limes Rd., Tettenhall, Wolverhampton, Staffs. (L.)
Longfield, Miss C., F.R.E.S. (1039), 11 Iverna Gdns., London W.8. (O.)
Lord Wandsworth College Scientific Society (1019†), Lord Wandsworth College, Long Sutton, nr. Basingstoke, Hants. Com. to P. G. Ide.
Lorimer, Dr. J. A. (576), 23 King's Ave., Buckhurst Hill, Essex. (L.)
Lorimer, R. I. (600), Braeside, Pine Grove, London N.20. (L.)
Lothian, D. M. (964), Backhill Cottage, East Hallside, Cambuslang, Glasgow. (L., C.)
Lovell, J. F. (1760), 26 Spensley Rd., Westoning, Bedford. (gen. ent. esp. C.)
Ludlam, R. (1519*), Pippins, Wymers Wood Rd., Burnham, Bucks. (L.)
Lydgate-Bell, H. G. (1176), 28 Hastings Way, Croxley Green, Herts. (L.)
Lynford Entomological Club (1599†), Lynford, Mundford, nr. Thetford, Norfolk. Com. to R. M. Brown. (gen. ent.)
Lyon, F. H. (1026), Green Headland, Sampford Peverell, Tiverton, Devon. (L.)
Mackworth-Praed, Lt. Col. C. W. (392), Castletop, Burley, Hants. (ent., Z., ornith.)
McCormick, W. J. (1736), Winchester Ave., Larkstone Terrace, Ilfracombe, Devon. (L.)
McCrae, A. W. R. (1144), Oak Lawn, Gordon Ave., Stanmore, Middx. (C., L.)
McCurdy, Dr. J. M. (1270), 161 Wigan Rd., Ashton-in-Makerfield, Lancashire. (L.)
McGill, W. (1739), 24 Saxon St., Liverpool 6. (D., C., Siphonaptera)
McLaughlan, E. A. (1934*), 35 Lindsey Rd., Dagenham, Essex. (C., L.)
Maclaurin, A. M. (1282), Oldhallhouse, Kilmacolm, Renfrewshire. (gen. ent.)
McNally, P. (1429), 11 Tennant Rd., Paisley, Renfrewshire.
Macnicol, Dr. D. A. B. (67), 52 St. Albans Rd., Edinburgh 9. (L., ML., P.)
Maggs, P. (244), Clay Copse, Sway, Lymington, Hants. (L.)
Major, A. P. (1117), 21 Tufton Rd., Rainham, nr. Gillingham, Kent. (NH., gen. ent.)
Makings, P. (1892), Lon-Dor, Ousebridge Drive, Carlton, Nottingham. (L., H.)
Malham Tarn Field Centre (1595†), nr. Settle, Yorkshire. Com. to P. Holmes, M.A., Warden. (gen. ent.)
Manly, G. B. (427), 72 Tenbury Rd., King's Heath, Birmingham. (L.)
Manning, S. A., F.L.S., F.R.S.A. (1774), 4 Patterson Rd., Norwich, Norfolk. (H., Insect Galls)
Mansfield, M. J. (134), 5 Chigwell Rd., Bournemouth, Hants. (gen. ent.)
Manson, A. (1727), 13 Park Ave., Portobello, Midlothian. (L.)
Marchant, I. D. (1544), 56 Woodside Court Rd., Addiscombe, Croydon, Surrey. (L.)
Marsden, C. (1904*), 11 Worrall Drive, Worrall, Sheffield, Yorks. (L.)

Marsden, P. D. (1292), 126 Firs Lane, London N.21. (L.)
Marshallsay, F. C. (1272), 23 High Street, Fordington, Dorchester, Dorset. (L., C., H.)
Marson, J. E., F.Z.S., F.R.E.S. (1390), 35 High Park Drive, Heaton, Bradford, Yorks. (pond life, Arachnida)
Martin, E. L. (801), 9 Devonshire Rd., Harrow, Middx. (L., esp. ML., T.)
Martin, P. M. (1741*), 310 Cowley Rd., Oxford. (L.)
Mason, N. P. (1758*), Glengarry, Cedar Rd., Farnborough, Hants. (L.)
Maxwell, Sir Reginald M., M.A., G.C.I.E., K.C.S.I. (1852), Barford House, St. Mary Bourne, Andover, Hants. (L.)
May, J. T. (1775), Homeland, Beech, Alton, Hants. (L.)
Mayne, J. (1874*), 191 Bitterne Rd., Southampton, Hants. (L.)
Mead, W. J. (1578), 58 Cedar Lawn Ave., Barnet, Herts. (L.)
Menlove, Miss E. M. (1604), Havering, Sandy Lodge, nr. Northwood, Middx. (O., L.)
Menzies, I. S. (585), Eden Roc, Florida Rd., Ferring-by-Sea, Sussex. (L., ML., C., H.)
Messenger, J. B. (1783*), 1 Chaucer Mansions, Queen's Club Gardens, West Kensington W.14. (L.)
Michael, P. (748), 56 Cranmore Lane, Aldershot, Hants. (NH., M., Ichthyology, L.)
Michaelis, H. N. (1216), 10 Didsbury Park, Manchester 20. (L. including Indian R.)
Milden, C. (1769*), Glentorr, Bideford, N. Devon.
Miles, B. R. (1613*), 303 Selsdon Rd., South Croydon, Surrey. (L.)
Millard, W. J. (80), 8 York Place, Clifton, Bristol 8. (gen. ent., L., pond life)
Miller, F. C. (1223), 7 Gabriels Hill, Maidstone, Kent. (L.)
Miller, S. W. (1287), 5 Bedford Terrace, Portobello, Midlothian. (L., C.)
Millon, R. (1496), 73 Rue Jenner, Fives-Lille, Nord, France. (gen. ent.)
Mills, D. N. (1893), 3 Burnside Rd., West Bridgford, Nottingham. (C.)
Mills, G. (1876), 120 Greengate St., Oldham, Lancs. (C., L., O.)
Mills, H. C. (1228), Thorneycroft, Greenway, Hutton Mount, nr. Brentwood, Essex. (H., L.)
Mitchell, A. R. (1750*), 11 Old Oak Rd., Acton W.3. (L.)
Mitchell, Miss E. M. (1814), Clay Cross Vicarage, Chesterfield, Derbyshire.
Molyneaux, S. R. (1180), 40 Coxford Rd., Maybush, Southampton, Hants. (gen. ent. esp. C.)
Moody, N. H. (693), 119 Southampton Rd., Ringwood, Hants. (L.)
Moon, H. N. (1652), 6 Salutation Rd., Darlington, Durham. (gen. ent.)
Moore, D. M. (1248), Thom Hill House, Prospect Place, Barnard Castle, Co. Durham. (L., gen. ent.)
Moore, J. (146), Kemerton Lodge, nr. Tewkesbury, Glos. (L.)
Moppett, A. A., B.A. (1841), 39 Fairdale Gdns., Hayes, Middx. (gen. ent.)
Morgan, H. G., M.A. (90), Staplake Mount, Starcross, Exeter, Devon. (Hem. esp. Aphididae, aq. Het., E., gen., econ., and agric. ent.)
Morgan, J. R. (1515), 12 The Grove, Ringstead, Kettering, Northants. (L.)
Morris, M. (1678), 9 King's Ave., Lowton-St-Mary's, nr. Warrington, Lancs.
Morton, J. K. (522), The Manse, The Avenue, Birtley, Co. Durham. (L.)
Morton, M. R. (1898*), Langleys, West Lane, East Grinstead, Sussex. (L.)
Morton, Miss M. E. (924), 20 Leeds Rd., Barwick-in-Elmet, Leeds, Yorks. (L., mic.)
Moss, B. T. M. (1335), 12 The Bungalows, Windmill Rd., Halstead, Essex. (H., L.)
Mulliner, A. E. (1922), "Arlingham," 35 Fairview St., Cheltenham, Glos. (gen. ent., esp. L., O.)
Murchie, W. R. (634), Box 203 Sharon, Pennsylvania, U.S.A. (L., gen. ent., Z.)
Murray, Dr. H. (177), Ashbourne, Clonmel, Co. Tipperary, Eire. (L.)
Myatt, G. (1767), School House, Springfield Rd., Blackheath, Birmingham. (L.)
Narbeth, B. (1894*), Culner House, 36 Linden Rd., Bedford. (L.)
Nash, A. J. D. (1501), Mill House, Little Missenden, Bucks.

Nathan, L. (428), 19 Monton St., Moss-side, Manchester 14. (ent., L.)

Nature Conservancy, The (1901†), 91 Victoria St., S.W.1. Com. to Lt. Col. W. B. L. Manley.

Neal, E. G., B.Sc. (467), 2 Bishop's Mead, Kingston Rd., Taunton, Som. (L., C., Hem., P.)

Neal, P. G. (1103), 177 Braemore Rd., Goodmayes, Essex. (L.)

Nelson Hall Training College for Women (1646†), Stafford. Com. to Miss E. G. Mallock, M.A. (B.)

Nelson, J. M. (1751), The Shieling, Castletown, Isle of Man. (gen. ent.)

Ness, A. R. (549), 15 Homefield Ave., Newbury Park, Ilford, Essex. (L.)

Nestel, B. L. (1362), 31 Filey Ave., London N.16. (gen. ent., L.)

Newland, R. M. (1454), Geraldine, Watton Rd., Knebworth, Herts. (L.)

Newlands, M. J. (1475), 20 Julians Rd., Stevenage, Herts. (L.)

Newman, D. E. (65), 106 Woodside, London S.W.19. (R.)

Newman, E. T. (1621), Hollyhocks, Guildford Rd., Cranleigh, Surrey. (R.)

Newman, L. H. (503), The Butterfly Farm, Bexley, Kent. (L.)

Newson, P. (842), 19 Rowlands Keld, Hutton Gate, Guisborough, Yorks. (L.)

Newton, Dr. A. H., M.B., Ch.B., F.R.E.S. (1140), Charles Johnson Memorial Hospital, Ngutu, Zululand, S. Africa. (O., C.)

Newton, J. (439), 11 Oxleaze Close, Tetbury, Glos. (L.)

Nisbet, K. J. (1820), Invergarry, Medeira Walk, Church Stretton, Shropshire. (L., P. of insects)

Norman, Dr. T. (68), c/o Miss Dunderdale, 63 Chatsworth Rd., Willesden N.W.2. (H., L., D., parasites of L.)

North, R. S. (654), 41 Buckingham Rd., Aylesbury, Bucks. (L.)

Northern Naturalists' Club (1828†), 80 Fonthill Rd., Aberdeen. Com. to Hon. Sec. J. B. Coutts.

Notre Dame High School (995†), Battersea Park Rd., London S.W.8. Com. to M. Finneron.

Nott, J. C. (1913), 1 Buckleigh Ave., Merton Park, London S.W.20. (L.)

Ogden, J. B. (1580), "Willow House," Cote Hill, Burnley Rd., Halifax, Yorks. (L., Genetics)

Ogden, J. S. (1070), Argwendon, Green St., Sunbury-on-Thames, Middx. (L., C.)

Ogden, William S. (1018), South Lodge, Reading Rd., Cholsey, Berks. (L.)

Ollevant, D. (1514), 172 Stockwell Rd., London S.W.9. (L.)

O'Rourke, F. J. (191), Dept. of Entomology and Parasitology, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool, 3. (H.)

Otter, G. W. (475), Southwood, Blandford Rd., Broadstone, Dorset. (L., C., T.)

Ottewell, B. (1856*), 100 Scalford Rd., Melton Mowbray, Leics. (L.)

Oundle School N.H.S. (1395†), 2 Old Dryden House, Oundle, Peterborough. Com. to J. Hepburn. (L.)

Owers, D. E. (1319), 114 Demesne Rd., Wallington, Surrey. (L., C., O.)

Owston, E. (1334), 17 Avenue Rd., Scarborough, Yorks. (L.)

Packard-Rayne, B. C. (1793), Franklyn House, La Motte St., St. Helier, Jersey, C.I. (O.)

Packer, R. (1896*), 62 Oakfield Rd., Clifton, Bristol 8.

Padron, A. G. (1560), Primo Rivera 23, Santa Cruz de Tenerife, Canary Islands. (C.)

Page, E. S. (598), The Gables, Cookham Dean, Berks. (L.)

Page, R. L. S. (742), Abbots Gate, Falcon Gdns., Minster, Sheppey, Kent. (gen. ent.)

Palmer, J. L. (900), "Trethias," Lidden, Penzance, Cornwall. (Organisation of entomological and phenological returns)

Palmer, R., F.R.E.S., F.Z.S. (1815), Hollydale, Aspley Guise, Bletchley, Bucks. (agric., aq., H., mic., O., ornith., Orth.)

Park, F. B. (1329), 7 The Chilterns, Brighton Rd., Sutton, Surrey. (H.)

Parker, C. F. (803), 61 Winchcomb Gdns., London S.E.9. (L., mic.)

Parker, E. (865), Feathercombe, Hambledon, Godalming, Surrey. (M.)

Parker, H. (738), 21 Park Way, Southwick, Sussex. (gen. ent., NH.)

Parker, R. A. B. (1535), 63 Rainham Rd., Gillingham, Kent. (gen. ent.)

Parmenter, L., F.R.E.S., (895), 94 Fairlands Ave., Thornton Heath, Surrey. (D.)

Parry, D. E., (1916*), 15 Warwick Rd., Southampton, Hants. (L., C.)

Parsons, R. E. R., F.R.E.S. (1512), Woodlands Lodge, Woodlands Close, Ottershaw, Surrey. (L.)

Parsons, T. (1513), 28 St. John's St., Ogmore Vale, Bridgend, Glamorgan. (L.)

Pauley, R. C. (572), 147 So. Pine Ave., Albany 8, N.Y., U.S.A.

Payne, Miss D. A. (1902), Heylands Court, Lee-on-the-Solent, Hants. (gen. ent.)

Payne, J. H. (353), 10 Ranelagh Rd., Wellingborough, Northants. (L.)

Pearce, Rev. E. J., M.A. (796), St. Teilo's Priory, Church Terrace, Roath, Cardiff. (C. esp. Haliplidae, Pselaphidae, distribution)

Pearson, A. E. G. (1677), 18 Abbotswood, Guildford, Surrey. (C., mic.)

Peel, D. H. (1218), 7 Bushway, Dagenham, Essex. (R. British and exot.)

Pelham-Clinton, E. C. (1399), 74 Grange Loan, Edinburgh 9. (L.)

Pennock, E. T. (82), 16 Drive Rd., Linthouse, Glasgow S.W.1. (L.)

Penrose, R. J. (1467*), 86 Mildred Ave., Watford, Herts. (L.)

Percy, A. A. (1763), Bourock, Dunlop, Kilmarnock, Ayrshire. (agric. ent.)

Perrins, C. M. (1133*), Thursday Cottage, Ember Lane, Esher, Surrey. (L.)

Petty, George R. (1113), 106 King's Rd., Rayners Lane, Harrow, Middx. (gen. ent.)

Petty, K. (1561), 21 Princess Cres., Bolton, nr. Bradford, Yorks. (gen. ent., L.)

Phebey, P. R. (1293), 45 Willrose Crescent, London S.E.2. (L., H., C.)

Pickering, E. C. (1243), 31 Alexandra Drive, Surbiton, Surrey. (H.)

Pickett, A. H., L.D.S., D.M.D. (37), 32a Chatsworth Rd., Brighton, Sussex. (L.)

Pilcher, T. F. (1914), " Bramacre." Stevenage Rd., Knebworth, Herts. (Silkmoths)

Platts, J. H. (515), Lawn Cottage, Sway Rd., Brockenhurst, Hants. (L.)

Podmore, Miss J. S. (1607*), 23 King's Close, Wilmslow, Cheshire. (gen. ent.)

Ponchaud, A. J. (1887), 38 Southampton Rd., Ringwood, Hants. (L.)

Pontin, A. J. (1670), 15 Southdale Rd., Summertown, Oxford. (L., O., C., genetics)

Pook, J. (1596*), The Gate, Stroud Farm Rd., Holyport, nr. Maidenhead, Berks. (L.)

Poole, K. H. (133), 55 The Boulevard, Weston-super-Mare, Somerset. (L.)

Poole, T. B. (1681), 19 Lynton Ave., Toller Lane, Bradford, Yorks. (gen. ent., H. Aculeata)

Pople, L. (1697*), 165 Sibthorpe Rd., Horn Park, Lee S.E. 12. (L., C.)

Port, M. H. (799), 31 Pinner View, Harrow, Middx. (Orth., L.)

Porter, D. T. (1759*), 83 Pasture Rd., North Wembley, Middx. (L., ornith.)

Pow, A. (39), 5 Dakers Place, Hawick, Roxburghshire. (L.)

Pratt, C. B. (784), 1 West Ham Lane, London E.15. (L.)

Pratt, P. W. (1908), 49 Beale St., Dunstable, Beds. (L.)

Prevett, P. F. (1802*), Station House, British Railways, Mitcham Junction Station, Surrey. (C.)

Price, L. (1478), " Springdale," Rodborough Ave., Stroud, Glos. (L., C.)

Prichard, R. (460), 4 Woodcroft Lane, Bebington, Cheshire. (L., ML.)

Proctor, W. (1723), 133 Westcotes, Coventry, Warks. (L.)

Pullen, G. H. (1622), 36 Firlands Scott Rd., Bishops Stortford, Herts. (C., Orth., mic.)

Purvis, L. E. (941), " One Oak," Hale Rd., Hale Barns, Cheshire. (L.)

Putnam, C. D. (1383), " Davenants," Sible Hedingham, Halstead, Essex. (gen. ent.)

Rae, A. G., B.Sc., M.R.C.V.S. (1789), Aberure, Boroughbridge, York. (L.)

Ramsden, E. (130), 2 Temple Rd., Bishopthorpe, York. (L.)

Ramsay, F. J. (837), Old Manse, Kilbarchan, Renfrewshire. (gen. ent.)

Randall, M. C. (535), 64 Mount Pleasant Rd., Chigwell, Essex. (L.)

Ranger, J. E. A. (1002), 54 Cherry Crescent, Brentford, Middx. (L., Locusts)

Ransom, F. E. (1810), 47 York Rd., Bury St. Edmunds, Suffolk. (C., L.)

Raven, Leslie (135), 196 Culson Rd., Coventry, Warwickshire. (L.)

Raybould, J. N. (1302*), 8 Ember Farm Ave., E. Molesey, Surrey. (gen. ent.)

Rayner, A. (1818*), "Evans House," Sedbergh School, Sedbergh, Yorks. (gen. ent.)

Read, E. C. (855), Stoney Corner, Meopham, Kent. (NH.)

Read, F. D. B. (1721*), Pease Close, Throwleigh, nr. Okehampton, Devon. (L.)

Read, Miss M. J. L. (1686*), Hawthorn, Longfield Ave., New Barn, Longfield, Kent. (gen. ent., NH.)

Read, R. (1782), 43 Holly Terrace, Hensingham, Whitehaven, Cumberland. (L., gen. ent.)

Readwin, B. (820), 36 Warley Hill, Brentwood, Essex. (gen. ent.)

Redgrave, A. C. R. (1639), 14a The Broadway, Portswood, Southampton, Hants. (L., ML.)

Redgrove, D. R. (1842*), Orchard End, Albion Rd., Kingston, Surrey. (L.)

Reid, J. F. (1821), 19 High Street, Leighton Buzzard, Beds. (L.)

Renfrew, C. (1507), Lanhill, Bourton-on-the-Water, Glos. (L., gen. ent.)

Revell, A. L. (1827*), "Mullion," Tudor Rd., Kennington, Ashford, Kent. (L.)

Reynolds, W. E. (1350*), 8 Clifton Rd., Squires Lane, London W.3. (L.)

Richardson, Austin (483), Beaudesert Park, Minchinhampton, Glos. (L.)

Richardson, N. A. (431), 1 The Crescent, Haversham, Bucks. (L.)

Riley, D. A. (1477*), 25 Lombard Ave., West Southbourne, Bournemouth, Hants. (L.)

Riley, H. (1819), Great Moulton, Norwich, Norfolk. (gen. ent.)

Ritson, William (1112), 12 West St., Winwick Rd., Warrington, Lancs. (ornith., gen. ent., esp. C., Orth.)

Rivers, C. F. (1443), 250 Shepherds Lane, Dartford, Kent. (L.)

Roberts, E. J. G. (1771*), Silver Wings, Epping Main Rd., North Weald, Essex. (O.)

Roberts, S. F. (216), 29 Holliers Hill, Bexhill-on-Sea, Sussex. (C.)

Roberts, W. N., B.Sc. (Econ.), F.R.Econ.S. (77), 48 Bishops Mansions, Bishop Park Rd., London S.W.6. (L., gen. ent.)

Robertson, A. W. (323), "Ranworth," St. Lawrence Drive, Eastcote, Middx. (E.)

Robertson, J. A. (224), The Gardens, Rotherby, Melton Mowbray, Leics. (L.)

Robinson, Cyril A. (1085), 155 Regent St., Kettering, Northants. (L., C., O.)

Robinson, H. S. (1518), Lower Farrington, Alton, Hants. (L.)

Robson, J. P. (44), 10 Vane Rd., Barnard Castle, Co. Durham. (L., ML.)

Roe, W. D. (1671), 43 Kirkeley Cliff Rd., S. Lowestoft, Suffolk. (C., E.)

Rogerson, S. (1398), 10 Shelley Ave., Sutton Trust Estate, Hull. (L.)

Rolfe, W. D. I. (1928*), 40 Woodhall Crescent, Hornchurch, Essex. (L., esp. Sphingidae)

Rooker, H. J. (1650*), "Birchfield," Weeping Cross, Stafford. (gen. ent., ornith., aq.)

Rossner, (S/L A. (1611), 14 Anglesey Gdns., Carshalton Beeches, Surrey. (L.)

Roudier, A. J. (1294), 6 Square Georges Lesage, Paris 12e, France. (C., L.)

Row, Capt. A. W. H. (1316), 3 Down Rd., Rodwell, Weymouth, Dorset. (L., C., H.)

Rowden, A. O. (405), Rydon Crest, Countess Wear, Exeter, Devon. (gen. ent.)

Rowell, C. H. F. (1865), 4 North Lane, Elwick, West Hartlepool, Co. Durham. (L., H., N.)

Rudland, W. L., F.R.E.S. (249), 97 Addison Rd., Reading, Berks. (L., ML., H.)

Rumsey, F. W. (1886), 46 Warren Rd., Banstead, Surrey. (L.)

Russell, S. G. Castle (119), 5 Bridge Rd., Cranleigh, Surrey. (R. vars.)

Russell, W. (412), 69 Lochlea Rd., Glasgow S.3. (L., camouflage)

Russell, W. E. (1525), 741 Lincoln Rd., Peterborough, Northants. (L.)

Rutherford Grammar School (Boys) (1830†), Newcastle-on-Tyne. Com. to W. W. L. Halkier. (gen. ent.)

Ruthven, D. J. (1780*), "Mayfield," North Walsham Rd., Sprowston, Norwich, Norfolk. (gen. ent.)

St. Edward's School (1405†), Oxford. Com. to A. M. Emmet, M.A. (gen. ent.)

Sandy, D. G. (1785), 26 Thorneyfields Lane, Stafford. (C., L.)

Sangster, D. R. (578), 69 Leadside Rd., Aberdeen. (L.)

Sargent, H. B. (1189), Rose Cottage, Breage, Helston, Cornwall. (breeding L., Bot. of county)

Saundby, Air Marshall Sir R., H.M.S., K.B.E., C.B., M.C., D.F.C., A.F.C., F.R.E.S. (1817), Oxleas, Burghclere, nr. Newbury, Berks. (L., local lists and museums.)

Schofield, F. (1877), 2 Glen View, Clover Hill, Halifax, Yorks. (O., L., D.)

Scott, D. G. (534), Ladymead, Berkley March, nr Frome, Som. (L.)

Scott, O. S. (1762*), 15 Cromwell Rd., Boscombe East, Bournemouth, Hants. (L.)

Scott, Peter (1163), 28 Cragside Crescent, Hawksworth Estate, Leeds 5.

Scott, W. (1403), 6 Crocketts Ave., Crocketts Rd., Birmingham 21 (R.)

Seabrook, W. P. (263), St. Barnabas, Frinton-on-Sea, Essex. (L.)

Seago, J. H. (1466*), 63 Huddersfield Rd., Barnsley, Yorkshire. (L.)

Searle, H. R. (1926), 17 Agnes Ave., Leigh-on-Sea, Essex. (H.)

Sexton, E. T. (1367), 48 Ravenscourt Gdns., London W.6. (gen. ent.)

Shapland, J. D. (548), Foamite Ltd., 235-241 Regent Street, London W.1 (L., mic.)

Shappirio, David G. (1159), 4811 17th Street, N.W., Washington 11, D.C., U.S.A. (H. esp. Vespoidea, Sphecoidea, Chrysidoidea)

Shaw, H. K. Airy, B.A., F.L.S., F.R.E.S. (545), Royal Botanic Gardens, Key, Surrey. (Orth., Het., C., E., Bot., NH. Socs.)

Shaw, J. P. (1204), The Mental Hospital, Weyburn, Sask., Canada (L.)

Shaw, M. W. (911), Dept of Advisory Entomology, Marischal College, Aberdeen. (gen. agri. ent. esp. Fruit pests)

Shaw, R. G. (1486*), 5 Burnham Rd., London E.4. (L.)

Sheppard, P. M. (291), Dept. of Zoology and Comparative Anatomy, University Museum, Oxford. (L., gen. ent.)

Shield, Donald H. (1156), The Hall, Badwell Ash, Bury St. Edmunds, Suffolk. (L.)

Short, M. A. (1770*), 4 Osborne Rd., Morecambe West, Lancashire. (L.)

Showler, A. J. (1442), 19 Harvel Crescent, London S.E.2. (L.)

Siggs, L. W. (243), 10 Repton Road, Orpington, Kent. (L.)

Simpson-Scott, C. J. (1938), 92 Brockenhurst Ave., Worcester Park, Surrey. (gen. ent.)

Skegness Grammar School (1835†), Skegness, Lincs Com. to Miss M. Langley. (L., C.)

Skidmore, J. (1705*), 240 Grains Rd., Shaw, Lancs. (L., C.)

Slack, Rev. J. (1629), 48 Station Rd., Petersfield, Hants. (C.)

Slatter, A. J. (131), Public Health Dept., Port Moresby, Papua.

Small, Harold Meanwell (1349), Stones Cottages, Skellingthorpe, Lincs. (L., O.)

Smith, D. J. (1324), 16 Roylesden Crescent, Chester Rd. North, Sutton Coldfield, nr. Birmingham. (L., C., D.)

Smith, D. S. (1755*), 87 Willingdon Rd., Eastbourne, Sussex. (L., C.)

Smith, E. K. (178), 38 Weyhill Rd., Andover, Hants. (L., veterinary ent.)

Smith, E. W. (1207), 93 Craithie Rd., Town Moor, Doncaster, Yorks. (L.)

Smith, F. Stanley (389), Hatch House, Pilgrims Hatch, Brentwood, Essex. (L.)

Smith, G. A. (942), 1 Acton Rd., Bramford, Suffolk. (L.)

Smith, G. C. (1406), Furzehill, Fordingbridge, Hants.

Smith, J. A. J. (1654), 183 Winslem Rd., Bradford-on-Avon, Wilts. (L., gen. ent.)

Smith, J. S. (1863*), The Rhyddings, Ridgebourne Rd., Shrewsbury. (gen. ent.)

Smith, Kenneth G., F.R.E.S. (897), 38 Barrow St., Much Wenlock, Shropshire. (D., L., gen. ent., NH, B.)

Smith, K. J. (1289*), 21 The Mount, Cheylesmore, Coventry, Warks. (L.)

Smith, P. Siviter (250), 21 Melville Hall, Holly Rd., Birmingham 16. (L., P.)

Smith, S. F. (1849), 69 Standard Ave., Coventry. (L.)

Smith, S. Gordon, F.L.S., F.R.E.S. (478), Estyn, Boughton, Chester. (L.)

Smith, T. H. W. (1462), 13 Oxford St., Rugby, Warks. (L.)

Smith, W. R. (1641), 105 King Edward Ave., Southampton. (L.)
Snell, B. B. (419), Woodsome, Plymyard Ave., Bromborough, Cheshire. (L., ML.)
South, A. (1586*), "Ikaya," Frindsbury Hill, Strood, Rochester, Kent. (R., aq.)
Southville Boys' Insect Club, The (1567†), Southville Secondary School, Ashton Gate, Bristol 3. Com. to G. E. Lovell. (L. esp. Silkmoths)
Southwick, Miss M. D. (792), c/o Zoological Society, Regent's Park, N.W.8. (L.)
Southwood, T. R. E., F.R.E.S. (1051), Parrock Manor, Old Road East, Gravesend, Kent. (Het., C., E.)
Spearman, R. I. C. (921), Oaks Bungalow, Oaks Ave., London S.E.19. (B., NH, social insects)
Spencer, W. R. (1668), 133 Abington Ave., Northampton. (L., Beekeeping)
Sperry, J. L. (1434), 3260 Redwood Drive, Riverside, California, U.S.A. (L.)
Spink, G. Frederick (1386), 237 Leigham Court Rd., London S.W.16. (C.)
Spittles, C. E. (1483), "Schoolhouse," Drayton Beauchamp, nr. Aylesbury, Bucks. (L.)
Stallwood, B. R. (1547), 19 Southfield Gdns., Strawberry Hill, Twickenham, Middx. (L., O.)
Stammers, P. S. (1649), 49 Ellerby St., Fulham, S.W.6. (L.)
Steel, J. A. (1333*), 127 King George's Rd., Ware, Herts. (L.)
Stidson, Eng. Capt. Stanley T., R.N., J.P., F.R.E.S., M.S.B.E. (40), "Ashe," Ashburton, Newton Abbot, Devon. (L.)
Stocker, P. P. (933), Waldorf Hotel, Aldwych, London W.C.2. (L., Brit. and continental ent. lit.)
Stokes, Capt. G. E. (319), The Brambles, Roe Green, Hatfield, Herts. (L.)
Stokes, H. G. (828), 12 Roman Rd., Salisbury, Wilts. (Hem., C.)
Storer, T. A. (1254*). 586128 A/A Storer, T. A., C Flight, B Squadron, No. 1 (OPPS) Wing, R.A.F., Cranwell, Sleaford, Lincs. (L.)
Storey, W. H. (277), Fairstead, Long Rd., Cambridge. (L.)
Stroud, R. W. (1911*), 12 Sheridan Terrace, Whitton Ave. West, Northolt Park, Greenford, Middx. (L., O.)
Struthers, F. M. (1696), 143a, Gander Green Lane, Cheam, Surrey. (L.)
Sturdy, D. A., B.Sc. (988), 1 Waldringfield Court, Braintree Rd., Felsted, Essex. (D., O., agric. ent.)
Stutt, P. D. (1848*), 24 Westcote Rise, Ruislip, Middx.
Suffield, N. L. (1157), 8 Park Place West, Sunderland, Co. Durham. (gen. ent.)
Sutton, Francis G. (403), 58 Blakemere Rd., Welwyn Garden City, Herts. (B., ornith., gen. ent. Silkmoths)
Sutton, F. R. (538), 42 Fairfield Drive, London S.W.18). (L.)
Sutton, G. R. (237), 6 Kenilworth Gdns., Loughton, Essex. (L., C.)
Swain, A. M (1409), 253 Crescent Drive, Petts Wood, Kent. (L.)
Swain, F. A. (1418), 48 Malvern Rd., Orpington, Kent. (L.)
Swain, H. D., M.A., F.R.E.S. (1800), 47 Dryburgh Rd., Putney. (L., H., C., Hem.)
Swann, E. L. (882), 282 Wootton Rd., King's Lynn, Norfolk. (Bot., C.)
Swanson, Sinclair, M.A. (1034), Keiss Village, Wick, Caithness. (L., gen. ent.)
Syms, E. E., F.R.E.S. (406), 22 Woodlands Ave., London E.11. (P., gen. ent., breeding)
Tailby, S. R., B.Sc., A.R.I.C. (636), 33 Alexandra Drive, Surbiton, Surrey. (L.)
Talbot, de Malahide, Lord (384), 50 York Terrace, London N.W.1. (L.)
Tampion, W. (1694*), 21 Romsey Rd., Shirley, Southampton, Hants. (C., L., gen. ent.)
Tams, W. H. T., ‡, Dept. of Entomology, British Museum (Nat. Hist.), London S.W.7. (L., P., Arachnida)
Tanner, T. C. (1701), Ivy House, Meole Brace, Shrewsbury. (gen. ent.)
Tanton, M. T. (1890*), "Normandy," Lichfield Rd., Dunstall, Burton-on-Trent, Staffs. (L.)
Tappenden, G. B. (1682), "Roma," Kempshott Lane, Worting, Basingstoke, Hants. (L.)
Tayler, A. G. (433), Whiteshoots Hill, Bourton-on-the-Water, Cheltenham, Glos. (gen. ent.)
Taylor, A. S. (1510), c/o Mrs. Parkin, 277 Uppertown St., Bramley, Leeds. (C., L.)

Taylor, L. R. (441), "One Oak," Luton Rd., Kinsbourne Green, Harpenden, Herts. (L.)

Taylor, M. F. (1725*), 186 Holburne Rd., Blackheath, London S.E.3. (L., breeding)

Taylor, M. J. (1209), 51 Grange Rd., Kenton, Harrow, Middx. (L.)

Taylor, P. G., F.R.E.S. (719), 51 Woodlands Drive, Watford, Herts. (L., agric. pests, B., E., M., cave fauna)

Taylor, R. C. (1528), Newtown Cottages, Yattendon, Newbury, Berks. (L.)

Tebbs, H. F. (1897), 38 Cavendish St., Peterborough, Northants.

Templeton, R. (1794*), 73 High St., Rutherglen, Lanarkshire. (L., M., NH.)

Tesch, L. R., ‡, 37 Watts Ave., Rochester, Kent. (L.)

Thomas, B. R. (1709*), 2 Springfield Rd., Carmarthen, S. Wales. (L.)

Thomas, P. R. (1837), 21 Goat St., Haverfordwest, Pembs. (agric. ent.)

Thompson, R. T. (1825*), 33 Downton Rd., Salisbury, Wilts. (L.)

Thornton, J. N. (1413), 123 Otley Old Rd., Leeds 6. (L., H.)

Thornton, R. (1891*), 51 Richlands Ave., Stoneleigh, Ewell. (L.)

Thorp, R. W. T., B.A. (1259), Rose Lea, Alnmouth, Northumberland. (mic.)

Thorpe, H. J. (482), Perivale, Glenmore Lane, Quedgeley, Glos. (L., C., ornith.)

Thorpe, J. (1726), 77 Mount Pleasant, Woodley, Stockport, Cheshire. (Garden pests)

Todd, A. (1197), Wesley Villa, Thornley, Durham. (gen. ent.)

Todd, R. G. (1455), Burnt St., Wells-next-the-Sea, Norfolk. (L.)

Tonge, A. E. (274), Ashville, Trafford Rd., Alderley Edge, Cheshire. (L.)

Tonge, R. J. (1615*), 123 Rickmansworth Rd., Watford, Herts. (L., Bot., NH.)

Townsend, A. L. (1691), P.O. Box 276, Nakuru, Kenya Colony, E. Africa. (L.)

Tozer, D. (36), 98 Copdale Rd., Leicester. (L., C.)

Tremewan, W. G. (940), Wheal Rose, Scorrier, Redruth, Cornwall. (L.)

Tribbeck, R. A. (1322), "Weston," Titchfield Rd., Stubbington, nr. Fareham, Hants. (gen. ent., esp. C., E.)

Trought, T., M.A., F.R.E.S. (1373), c/o Dept. of Agriculture, Amman, Jordan. (L.)

Trought, T. E. T. (1480), St. John's College, Cambridge. (L., C., D.)

Trundell, E. E. J. (690), 6 Arragon Gdns., West Wickham, Kent. (ent. esp. L.)

Tully, H. (1038), Wellfield, Alnmouth, Northumberland. (C., O.)

Turner, H. B. (341), Malverleys, Newbury, Berks. (L.)

Turner, H. J. (696), 33 Pine Ave., West Southbourne, Bournemouth. (L.)

Turner, J. W. (1401), 18 Fox Covert Rd., Werrington, Peterborough, Northants. (L.)

Turner, Sidney J. (1014), 2 St. Leonard's Place, Exeter, Devon. (mic., Arachnida)

Twyford, H. S. (1205), 52 Purley Oaks Rd., Sanderstead, Surrey. (gen. ent.)

Tysoe Church School (1888†), Tysoe, Warwickshire. Com. to E. E. Farbrother. (gen. ent.)

Tyssen, J. G. C. (1870), "Rock Spring," Bradfield, Sheffield 6. (H.)

Uffen, R. W. J. (1660*), 4 Vaughan Ave., Stamford Brook, London W.6. (L.)

Ure, Malcolm (1354*), Woodlands, Seymour Court Rd., Marlow, Bucks. (L.)

Usher, R. (1768*), 25 Moncktons Ave., Maidstone, Kent. (L.)

Valletta, A., F.R.E.S. (1879), 257 Msida Street, B'Kara, Malta. (L., O., Orth.)

Vardy, C. R. (1414*) San Martino, Rushington Lane, Totton, Hants. (gen. ent.)

Vaughan-Roberts, R.E. (1410), Llys Athro, Llanarmon-yn-Iâl, Mold, (L., H, gen. ent.)

Ventom, M. G. (1733), 76a Stanlake Rd., Shepherds Bush, London W.12. (C.)

Vieujant, R. (898), 44 Avenue Georges Pètre, Brussels, Belgium. (C., H., L.)

Vigay, J. F. (1554*), 28 Tooting Bec Gdns., London S.W.16. (L.)

Vince, A. A. P. (588), 14 Church Hill, London N.21. (L., aq. C., glass-house pests)

Waddington, L. G. F. (169), 8 Lawn Ave., Doncaster, Yorks. (L.)

Wade, D. (1104), 17 Waldegrave Ave., Holderness Rd., Hull, Yorks. (L., breeding, ornith.)

Wadsworth, J. H. F. (1672*), 48 Bunbury Rd., Northfield, Birmingham. (L. O.)
Wager, J. R. (181), 10 Henshaw Rd., Birmingham, Warks. (L. esp. R.)
Wakeley, S. M. (1860), 26 Finsen Rd., Ruskin Park, S.E.5. (L., D., H.)
Wakely, Sir Leonard D. (561), 37 Marryat Rd., London S.W.19. (L.)
Walder, W. (102), 79 Livingstone Rd., Hove 3, Sussex. (L.)
Walding, H. J. (1673), 48 Freehold St., Northampton. (gen. ent.)
Walker, G. T. (1737), Manor House, Whitewell, nr. Worksop, Notts. (L.)
Walker, Dr. J. A. (843), Highfield House, Highfield, Cheddar, Somerset. (L., ML.)
Walker, M. N. A. (880), 329 Uxbridge Rd., London W.3. (L.)
Walker, P. J. (856*), 25 Regal Way, Preston Hill, Harrow, Middx. (gen. ent.)
Wall, G. (554), Hafod, Merstham, Surrey. (L., C., ornith.)
Wall, L. J. T. (1638), "Carclew," Bay View Terrace, Newquay, Cornwall. (L., Silkmoths).
Wallace, H. R. (318), 115 Abercrombie Rd., Fleetwood, Lancs. (L.)
Wallis, B. M. (1832), 72 The Downs, Altrincham, Cheshire. (L.)
Walsh, G. B., B.Sc. (24), 22 Stepney Drive, Scarborough, Yorks. (C., B., Hem.)
Walshe, Lt. Comdr. P. la B. (1834), First Floor Flat, 69 Hitchen Hatch Lane, Sevenoaks, Kent. (L.)
Walter, P. W. R. (1493*), 190 Carrhouse Rd., Hyde Park, Doncaster, Yorks. (L.)
Walton, A. M. (426), 275 Croxted Rd., London S.E.21. (L.)
Walton, R. S. (1925), Gipsy Hill Training College, Kenry House, Kingston Hill, Surrey. (L., ag. ent.)
Wanstall, P. J. (465), 54 Matlock Rd., Brighton 5, Sussex. (R., Mosquitoes)
Ward, B. T. (1597), 24 Long Deacon Rd., Chingford, Essex. (D. esp. Cecidomyiidae).
Ward, E. A. J. (709), 6 High St. Swanage, Dorset. (L.)
Ward, J. P. C. (1440), 8 Neal Ave., Southall, Middx. (L.)
Ward, K. E. (1680*), 129 Strouden Rd., Winton, Bournemouth, Hants. (L.)
Ward, P. S. (1729*), 23 Schola Green Lane, Morecombe, Lancs. (L., H.)
Warren, Brian Bates (1358), 1 Madeira Rd., Streatham, S.W.16. (C., L.)
Warwick County Museum (1773†), The Market Place, Warwick. Com. to the Curator.
Warwick, Dr. R., B.Sc., Ch.B. (1823), Medical School, University of Manchester, Manchester 13. (L.)
Washington, R. (1766), 2 Lodge Grove, Porthill, Staffs. (L.)
Waterman, G. J. (1787), 6 Princes Ave., Greenford, Middx. (gen. ent., H.)
Watkins, S. S. A., A.C.G.I., B.Sc., M.I.E.E. (1728), 60 Station Rd., Birchington, Kent. (L., D.)
Watson, R. W. (752), 15 Halstead Rd., Bittern, Southampton. (L.)
Watson, Dr. T. T. B. (1735), 58 Oxford Gdns., London W.10. (L., Silkmoths).
Watson, W. A. (1757), Leach Farm, Division Lane, St Annes-on-Sea, Lancs. (gen. ent. esp. Moths)
Watts, W. J. (240), 42 Bramerton Rd., Beckenham, Kent. (C.)
Waugh, R. M. (845), 154 Newsome Rd. South, Huddersfield, Yorks. (gen. ent. esp. L.)
Weaving, W. (1930), 27 Agnes Ave., Leigh-on-Sea, Essex. (Anoplura, H. Parasitica, D.)
Webb, H. E. (736), 20 Audley Rd., London N.W.4. (L.)
Weddell, B. W. (701), 13 The Halve, Trowbridge, Wilts. (L., ML.)
Weeks, J. R. (1853*), "Cleyleat," 4 Bradford Rd., Combe Down, Bath, Som. (L.)
Weightman, E. (1485), 6 Grasmere Crescent, Newcastle Rd., Sunderland, Co. Durham. (L.)
Weller, L. G. (1651), Yarrow, Ewhurst, Cranleigh, Surrey. (L.)
Wellington College Natural History Society (1537†), Crowthorne, Berks. Com. to C. H. Bulteal. (gen. ent.)
Welti, A., F.R.E.S. (402), 34 Great St. Helens, London E.C.3. (L.)
Whalley, P. (1310), The Walnuts, Epsom Rd., Merrow, Guildford, Surrey. (L.)
Whicher, L. S., F.R.E.S., A.R.Ae.S. (1345), 6 Chisholm Rd., Richmond, Surrey. (C.)
White, E. J., M.P.S., F.B.O.A., F.S.M.C. (1748), High St., Westerham, Kent. (L.)
White, G. B. (1749*), 65 Virginia Rd., Thornton Rd., Thornton Heath, Surrey. (L.)

White, K. M. (715), Blackpool Corner, Crewkerne Rd., Axminster, Devon. (H., gen. ent., bionomics)
White, O. M. (140), 78 Eastdale Rd., Nottingham. (D.)
Whitehorn, K. P. (1084), 205 Hither Green Lane, London S.E.13. (L.)
Whitfield, F. G. Sarrel, D.I.C., F.R.E.S., F.R.M.S. (1803), Avebury, Goring-on-Thames, Oxon. (gen. ent.)
Whitfield, L. L. (1805), 105c Station St., Birmingham 5. (L.)
Whitlock, R. N. (1900*), The Grove, Great Yeldham, Essex. (L.)
Whittington-Mee, R. (1929*), Meadow Cottage, Shorne, nr. Gravesend, Kent. (L., exot. Saturniidae)
Whittington, R. M. (1143), Toongahra, Castlefield Rd., Reigate, Surrey. (L.)
Wicks, W. D. (1658*), 19 Sunridge Ave., Luton, Beds. (L.)
Wiggin, A. J. (1428*), 172 Ingram Rd., Bloxwich, nr. Walsall, Staffs. (L.)
Wiggins, E. D. (975), Crawley Research Station, Brighton Rd., Crawley, Sussex. (C. esp. iridescent Phytophaga)
Williams, Dr. C. B., M.A., Sc.D., F.R.E.S.‡, Entomology Dept., Rothamsted Experimental Station, Harpenden, Herts. (gen. ent., M., B.)
Williams, J. M. (1754*), 5 Gernant, Rhiwbina, Cardiff. (L.)
Willshee, C. J. (420), 63 Daventry Rd., Coventry. (L.)
Willson, Miss D. A. (1747*), 198 Church Road, Leyton E.10. (L.)
Wilson, E. A., M.A. (1777), 14 Willson Crescent, Ellesmere, Salop. (aq. ent.)
Wilson, I. O. (1479), Jessfield, Honiton Rd., Exeter, Devon. (C.)
Wilson, J. A. (1542), 10 Railway St., Chatham, Kent. (gen. ent.)
Wilson, R. (1935*), 40 Battledean Rd., London, N.5.
Windsor, F. P. (785), Woodend, Horley, Surrey. (gen. ent.)
Wood, A. C. (1543), "Lauriston," Western Outway, Grimsby, Lincs. (L., H., C.)
Wood, Lt. Col. A. E. B. (1675), Huntly, Bishopsteignton, S. Devon. (R.)
Wood, E. F. (684), 18 Nursery Rd., Prestwich, Lancs. (L., ML., including exot.)
Wood, R. W. L. (1765), Morven, Vale Rd., Hartford, Cheshire. (Bees, Silkmoths)
Woodcock, A. J. A. (1008), 65 Rock Ave., Gillingham, Kent. (C. esp. Adephaga)
Woof, W. R. (721), 9 Marshall St., Barnard Castle, Co. Durham. (B., NH., L.)
Wootton, A. D. (1468), 36 Wayside Ave., Bushey, Herts. (L.)
Wright, A. E. (1666*), 53 Victoria Rd., Kensington, London W.8. (L.)
Wright, A. H. (355), 25 Markham Ave., Carcroft, Doncaster, Yorks. (L.)
Wright, J. (609), Lakota, Cranmore, nr. Yarmouth, I.O.W. (ornith., L., C.)
Wyers, N. (1241), "East View," Rayner St., Horbury, nr. Wakefield, Yorks. (L., ML.)
Xicluna, George (1936), 36 Mgr. Farrugia St., Victoria, Gozo, Malta. (L., C.)
Youngson, A. P. (1499), 55 Victoria Rd., Birmingham 9. (L., O.)

GEOGRAPHICAL KEY

The purpose of this list is to enable you to get into touch with local members, if you are moving to a new district, or for excursions or holidays. Even members not interested in the same groups must have much of general entomological interest to exchange.

BRITISH ISLES

ABERDEENSHIRE. **Aberdeen:** Esslemont, Northern Naturalists' Club, Sangster, Shaw. **Torphins:** Miss Innes.

ANGUS. **Dundee:** Hall.

AYRSHIRE. **Kilmarnock:** Claymore, Percy.

BEDFORDSHIRE. **Ampthill:** Lovett. **Bedford:** Jeffreys, Narbeth. **Dunstable:** Pratt. **Luton:** Chandler, Eberlie, Hill, Wickes. **Leighton Buzzard:** Heley, Reid. **Woburn:** Palmer.

BERKSHIRE. **Abingdon:** Bingham, Heafford. **Didcot:** Heard. **Maidenhead:** Crow, Ludlam, Page, Pook. **Newbury:** Saundby, Taylor, Turner. **Reading:** Clarke, Dolton, Rudland. **Wallingford:** Ogden. **Windsor:** Barnard. **Wokingham:** Cousins, Lady Liddell, Wellington College Natural History Society.

BUCKINGHAMSHIRE. **Amersham:** Evans. **Aylesbury:** North, Spittles. **Buckingham:** Flello. **Ches-**

ham: Nash. **Haversham:** Richardson. **Newport Pagnell:** Cripps. **Marlow:** Ure.

CAITHNESS. **Wick:** Swanson.

CAMBRIDGESHIRE. **Cambridge:** Ford, Gardiner, Goodman, Harrison, Hodge, Hunter, Storey, Trought. **Chatteris:** Clarke.

CARMARTHENSHIRE. **Carmarthen:** Thomas.

CARNARVONSHIRE. **Pwllheli:** Jones.

CHESHIRE. **Altrincham:** Pervis, Wallis. **Birkenhead:** Allen, Clarke, Leonard, Prichard, Snell. **Chester:** Smith. **Crewe:** Green. **Frodsham:** Downing. **Hartford:** Wood. **Macclesfield:** Ashmore, Tonge. **Nantwich:** Boyes. **Stalybridge:** Charlson. **Stockport:** Appleton, Dorrington, Goulding, Hincks, Thorpe. **Wilmslow:** Kloet, Miss Podmore.

CORK. **Bantry:** Graves.

CORNWALL. **Helston:** Sargent. **Newquay:** Wall. **Padstow:** Dexter. **Penzance:** Palmer. **Redruth:** Tremewan.

CUMBERLAND. **Scotby:** Bailey. **Whitehaven:** Hall, Read.

DERBYSHIRE. **Chesterfield:** Andrew, Bilbie, Johnson, Miss Mitchell. **Derby:** Hobday. **Dronfield:** Fearnhough. **Repton:** Bullock.

DEVONSHIRE. **Ashburton:** Kennard, Stidson. **Axminster:** Bliss, White. **Bideford:** Midlen. **Bishopsteignton:** Wood. **Budleigh Salterton:** Bradley. **Chagford:** Hollander. **Colyton:** Ashe. **Dartmouth:** Field Club, R.N. College. **Exeter:** Jeremy, Morgan, Rowden, Turner, Wilson. **Exmouth:** Exmouth Training College. **Honiton:** Finlay. **Ilfracombe:** Emery, McCormick. **Newton Abbot:** Lees. **Okehampton:** Read. **Plymouth:** Almy, Hamlyn, Haynes. **Tiverton:** Janes, Lyon. **Topsham:** Miss Ainsworth. **Totnes:** Bennett, M. T., Bennett, N. C.

DORSETSHIRE. **Dorchester:** Baker, Dalton, Lisney, Marshallsay. **Poole:** Britton, Otter. **Swanage:** Ward. **Weymouth:** Crocket, Row. **Wimborne:** Brown, R. M., Kerr.

DUBLIN. **Kingstown:** Baynes.

DUNBARTON. **Bearsden:** Hill.

DUMFRIES. **Dumfries:** Balfour-Browne, Cunningham.

DURHAM. **Barnard Castle:** Moore, Robson, Wooff. **Chester-le-Street:** Dunn. **Darlington:** Moon. **Durham:** Todd. **Gateshead:** Harrison. **Houghton-le-Spring:** The Field Club. **Sunderland:** Miss Goodall, Halstead, Jefferson, Morton, Suffield, Weightman.

West Hartlepool: Rowell. **Wolveston:** Miss Gregson.

ESSEX. **Barking:** Champion, Currie. **Braintree:** Hodges. **Brentwood:** Mills, Redwin, Smith. **Chelmsford:** Hurrell. **Chingford:** Ward. **Clacton:** Austin. **Colchester:** Bingley, Brown, P. C., Hartley. **Dagenham:** McLauchlan, Peel. **Dovercourt:** Hart. **Felsted:** Sturdy. **Gidea Park:** Fordham. **Great Yeldham:** Whitlock. **Halstead:** Gaze, Moss, Putnam. **Hornchurch:** Rolfe. **Ilford:** Grimwood, Hanlon, Neal, Ness. **Ingatestone:** Bartrop. **Laindon:** Chapman. **Leigh-on-Sea:** Hilton, Searle, Weaving. **Loughton:** Dyce, Sutton. **Maldon:** Hood. **North Weald:** Roberts. **Romford:** Gobbett. **Walton-on-the-Naze:** Seabrook. **Woodford:** Broughton, Chapman, Lorimer, Randall.

FIFE. **St Andrews:** Miss Jackson.

FLINT. **Caerwys:** Henstock, Hunking-Molyneux. **Rhuddlan:** Lewis. **Ruthin:** Vaughan-Roberts.

GLAMORGANSHIRE. **Bridgend:** Guile, Parson. **Caerphilly:** Bennett. **Cardiff:** Fidler, Pearce, Williams. **Merthyr Tidfil:** Evans.

GLOUCESTERSHIRE. **Bristol:** Bird, Caines, Carlton Park Secondary Modern Boys' School, Hobbs, Ireland, Millard, Packer, Southfield Boys' Insect Club. **Cheltenham:** Ashforth, Buck, Mulliner, Tayler. **Coleford:** Garraway. **Gloucester:** Clarke, Dixon, Gay, George, Kemp, Thorpe. **Stroud:** Richardson, Price. **Stow-on-the-Wold:** Renfrew. **Tetbury:** Newton. **Tewkesbury:** Moore.

HAMPSHIRE. **Aldershot:** Michael. **Alton:** May, Robinson. **Andover:** James, Maxwell, Smith, E. K. **Basingstoke:** Lord Wandsworth College Scientific Society, Tappenden. **Bournemouth:** Broome, Dicker, Fraser, Mansfield, Riley, Scott, Turner, Ward. **Brockenhurst:** Platts. **Eastleigh:** Holloway, Leonard. **Fareham:** Tribbeck. **Farnborough:** Fluck, Mason, **Fordingbridge:** Burnard, Smith, G. C. **Lee-on-the-Solent:** Miss Payne. **Lymington:** Antram, Farwell, Ham, Maggs. **Petersfield:** Miss Gibson, Slack. **Portsmouth:** Anderson, Buckett, Heppell, Langford. **Ringwood:** Mackworth-Praed, Moody, Ponchaud. **Southsea:** Hunt. **Southampton:** Fray, House, Mayne, Molyneaux, Parry, Redgrave, Smith, W. R., Tampion, Vardy, Watson.

HEREFORDSHIRE. **Ross:** Davies, Knight.

HERTFORDSHIRE. **Barnet:** Dutton, Mead. **Bishops Stortford:** Ashwell, Hick, Pullen. **Harpenden:** Gil-

bert, Jarvis, Taylor, Williams. **Hatfield:** Hodson, Stokes. **Rickmansworth:** Lydgate-Bell. **Stevenage:** Newland, Newlands, Pilcher. **Tring:** Cockayne, Goodson. **Ware:** Gerard, Graham, Steel. **Watford:** Clark, Fox, Knight, Penrose, Taylor, Tonge, Wootton. **Welwyn:** Sutton.

HUNTINGDONSHIRE. **Huntingdon:** Leeds.

INVERNESS. **Aviemore:** Harwood.

ISLE OF MAN. **Castletown:** Nelson.

ISLE OF WIGHT. **Yarmouth:** Blair, Wright. **Wroxhall:** Lobb.

KENT. **Ashford:** Revell, **Aylesford:** Homewood. **Beckenham:** Freeman, Gully, Lane. **Bexley:** Newman. **Biddenden:** Farley. **Birchington:** Watkins. **Bromley:** Bentley, Gowing-Scopes, Little, E. R. B., Little, J. C., Siggs, Swain, A. M., Swain, F. A., Trundell, Watts. **Canterbury:** Ferneley, George, Gorer. **Chatham:** Cameron, Greenwood, Major, Parker, South, Tesch, Wilson. Woodcock. **Cranbrook:** Boxall, Bull. **Dartford:** Cavanagh, Honeybourne, Rivers. **Faversham:** Featherstone. **Goudhurst:** Hodge. **Gravesend:** Grant, Read, Southwood, Whittington-Mee. **Hawkhurst:** Chatfield. **Isle of Sheppey:** Miss Levy. **Longfield:** Miss Read. **Maidstone:** Beaufoy, Earl, Henshaw, Miller, Usher. **Ramsgate:** Lanfear. **Sandwich:** Harle. **Sevenoaks:** Walshe. **Sheppey:** Page. **Sidcup:** Goodwin, Ling. **Sittingbourne:** Goddard. **Westerham:** Edwards, White.

LANARKSHIRE. **Glasgow:** Miss Craig, Lothian, Pennock, Russell, Templeton.

LANCASHIRE. **Bolton:** Coxey, Horton-Omerod. **Bury:** Bailey. **Dalton-in-Furness:** Allan. **Fleetwood:** Wallace. **Grange-over-Sands:** Berry. **Lancaster:** Harrison. **Liverpool:** Curd, Davidson, Miss Gough, McGill, O'Rourke. **Manchester:** Barbrook, Boardman, Michaelis, Nathan, Warwick, Wood. **Morecombe:** Short, Ward. **Oldham:** Lees, Mills, Skidmore. **Rochdale:** Hardman. **St Annes-on-Sea:** Watson. **Warrington:** McCurdy, Morris, Ritson.

LEICESTERSHIRE. **Leicester:** Hanson, Tozer. **Loughborough:** Henderson. **Market Harborough:** Buckler. **Melton Mowbray:** Gilson, Ottewell, Robertson.

LINCOLNSHIRE. **Boston:** Cooper, Mrs Cooper. **Grantham:** Chambers. **Grimsby:** Miss Hopkins, Jeffs, Wood. **Lincoln:** Small. **Skegness:** Skegness Grammar School. **Sleaford:** Haywood, Storer.

LONDON. **E.4.:** Miss Burrage, Keyes, Shaw. **E.7:** Baxter, L. N., Baxter, R. **E.10:** Miss Willson. **E.11:** Byford, Syms. **E.15:** Pratt. **E.17:** Ison. **E.C.3:** Colman, Welti. **N.3:** Reynolds. **N.5:** Wilson. **N.6:** Miss Entrican. **N.12:** Cross. **N.14:** A'Brook. **N.16:** Nestel. **N.18:** Gray, Janes. **N.20:** Carr, Lorimer. **N.21:** Latham, Marsden, Vince. **N.22:** Colyer. **N.W.1:** Lord Malahide. **N.W.2:** Norman. **N.W.3:** Braithwaite, Harrison-Gray. **N.W.4:** Lockington, Webb. **N.W.6:** Hawdon, Hillaby. **N.W.8:** Bushby, Leston, Miss Southwick. **N.W.10:** Mrs Cooper, Jaques. **N.W.11:** Gorer. **S.E.2:** Phebey, Showler. **S.E.3:** Hyatt, Taylor. **S.E.5:** Bradley, Wakeley. **S.E.9:** Miss Cove, Golding, Parker. **S.E.10:** Mrs Griffin. **S.E.12:** Bobe, Bruce, Fox, Goodbody, Pople. **S.E.13:** Harman, Whitehorn. **S.E.18:** Hards. **S.E.19:** Spearman. **S.E.21:** Walton. **S.E.23:** Bishop, Cork. **S.E.25:** Cornelius, Foss, Lewis. **S.E.26:** Ewart, Lamb. **S.W.1:** Collier, The Nature Conservancy. **S.W.2:** Edwards. **S.W.6:** Roberts, Stammers, **S.W.7:** Britton, Collins, Howarth, Tams. **S.W.8:** Notre Dame High School. **S.W.9:** Ollevant. **S.W.15:** Swain. **S.W.16:** Mrs Blake, Blake, T. G., Spink, Vigay, Warren. **S.W.17:** Dale. **S.W.18:** Sutton. **S.W.19:** Cartwright, Leppard, Newman, Wakeley. **S.W.20:** Nott. **W.1:** Gripper, Shapland. **W.3:** Mitchell, Walker. **W.5:** Hanson, A. R., Hanson, S.M., Locke. **W.6:** Sexton, Uffen. **W.8:** Brangham, Miss Longfield, Wright. **W.9:** Jones, A. W. **W.10:** Watson. **W.11:** Crotch. **W.12:** Ventom. **W.14:** Messenger. **W.C.1:** Harding. **W.C.2:** Stocker.

MIDDLESEX. **Bedfont:** Kindered. **Brentford:** Ranger. **Ealing:** Greenford County School Nat. Hist. Soc., Stroud, Ward, Waterman. **Enfield:** Eagles. **Feltham:** Classey. **Harrow:** Byerley, Chynoweth, Martin, Petty, Port, Taylor, Walker. **Hayes:** Moppett. **Northwood:** Miss Menlove. **Pinner:** Denman, Gilbert, Harris. **Potters Bar:** Hague. **Ruislip:** Bessant, Blackburn, Gilvary, Robertson, Stutt. **Stanmore:** Hatcher, Hilliard, McCrae. **Sunbury-on-Thames:** Ogden. **Twickenham:** Stallwood. **Wembley:** Porter.

MERIONETH. **Blaenau Festiniog:** Griffiths.

MIDLOTHIAN. **Bonnyrigg:** Basden. **Edinburgh:** Beattie, Ewing, Finlay,

Macnicol, Manson, Miller, Pelham-Clinton.

MONMOUTHSHIRE. **Newport:** Binning, Keen.

NORFOLK. **Dereham:** Durrant. **Diss:** Brewer. **King's Lynn:** Day, Swann. **Norwich:** Addison, Evans, Manning, Riley, Ruthven. **Stoke Ferry:** Fenn. **Thetford:** Lynford Entomological Club. **Wells-Next-The-Sea:** Todd.

NORTHAMPTONSHIRE. **Kettering:** Robinson. **Northampton:** Fisher, Spencer, Walding. **Oundle:** Oundle School Nat. Hist. Soc. **Peterborough:** Russell, Tebbs, Turner. **Thrapson:** Morgan. **Towcester:** Humphrey. **Wellingborough:** Gent, Payne.

NORTHUMBERLAND. **Alnwick:** Thorp, Tully. **Morpeth:** Halkier. **Newcastle-on-Tyne:** Benson, Burtt, Daley, Rutherford Grammar School (Boys). **Ponteland:** Barker. **Seahouses:** Ennion.

NOTTINGHAMSHIRE. **Carlton:** Makings. **Mapperley:** Deimel. **Nottingham:** Adams, Dibb, J. R., Dunkin, Hodson, White. **West Bridgford:** Mills. **Whitwell:** Walker.

OXFORDSHIRE. **Banbury:** Berkeley. **Bampton:** Lloyd. **Blandon:** Hammond. **Goring:** Whitfield. **Oxford:** Blackwell, Carpenter, Cooke, Cullum, Dalby, Emmet, Hookham, The Hope Professor, Martin, Pontin, St Edward's School, Sheppard.

PEMBROKESHIRE. **Haverfordwest:** Conder, Thomas.

RENFREWSHIRE. **Greenock:** Angus, Maclaurin. **Paisley:** McNally, Ramsay.

ROXBURGH. **Hawick:** Pow.

RUTLAND. **Oakham:** Bates.

SHETLAND ISLES. **Lerwick:** de Mercado.

SHROPSHIRE. **Church Stretton:** Nisbet. **Ellesmere:** Wilson. **Much Wenlock:** Smith. **Shrewsbury:** Darwin Society, Lloyd, Smith, Tanner. **Wellington:** Battersby.

SOMERSETSHIRE. **Bath:** Weeks. **Bridgwater:** Bing, Cowley. **Cheddar:** Walker. **Crewkerne:** Keylock. **Dulverton:** Heaman. **Frome:** Cruttwell, Scott. **Glastonbury:** Downing. **Taunton:** Hanson, Neal. **Wellington:** Archer. **Weston-super-Mare:** Ball, Blathwayt, Poole.

STAFFORDSHIRE. **Burton-on-Trent:** Clarke, Tanton. **Leek:** Miss Johnson. **Newcastle-under-Lyme:** Edwards. **Porthill:** Washington. **Smethwick:** Allaway. **Stafford:** Nelson Hall Training College, Rooker, Sandy. **Tamworth:** Dale. **Walsall:** Holmes, Wiggin. **Wolverhampton:** Long.

STIRLING. **Falkirk:** Hutchison.

SUFFOLK. **Bury St Edmunds:** Eley, Miss Gamble, Ransom, Shield. **Ipswich:** Beaufoy, Horsley, Smith. **Lowestoft:** Burton, Miss Long, Roe. **Stowmarket:** Chipperfield. **Woodbridge:** Garrett-Jones.

SURREY. **Ashtead:** Greenhill. **Banstead:** Rumsey. **Camberley:** Knight. **Carshalton:** Booker, Groves, Rossner. **Caterham:** Alderton, Deacon. **Chertsey:** Parsons. **Cranleigh:** Hurst, Kettlewell, Newman, Russell, Weller. **Croydon:** Barnett, Burrows, Collins, Field, Marchant, Miles, Parmenter, Twyford, White. **Dorking:** Kerrich, Haynes. **Epsom:** James, **Esher:** Perrins. **Ewell:** Goddard, Thorton. **Godalming:** Parker. **Guildford:** Barton, Holroyd, Pearson, Whalley. **Horley:** Windsor. **Kingston:** Miss Grattan, Lloyd, Redgrove, Walton. **Mitcham:** Prevett. **Morden:** Baker. **Reigate:** Brunsdon, Wall, Whittington. **Richmond:** Gittens, Shaw, Whicher. **Surbiton:** Austin, Burton, Cantwell, Durrant, Le Masurier, Pickering, Raybould, Simpson-Scott, Tailby. **Sutton:** Currie, Davies, Hyde-Wyatt, Last, Park, Struthers. **Wallington:** Christie, Collyer, Owers. **Weybridge:** Best, Dale. **Woking:** de Worms, Hellings.

SUSSEX. **Arundel:** Haggett. **Bexhill:** de Whalley, Roberts. **Brighton:** Banner, Durham, Dyson, Eade, Parker, Pickett, Walder, Wanstall. **Crawley:** Wiggins. **Eastbourne:** Smith. **East Grinstead:** Morton. **Felpham:** Cartwright. **Hastings:** Dannreuther. **Haywards Heath:** Brunswick School Nat. Hist. Soc., Edelsten, Levett. **Heathfield:** Crisp, Hitchens. **Horsham:** Blake. **Lewes:** Miss Brown. **Littlehampton:** Harper, G. W., Harper, M.W. **Midhurst:** Goddard. **Worthing:** Menzies.

TIPPERARY. **Clonmel:** Murray.

WARWICKSHIRE. **Birmingham:** Dixon, Ensor, Fountain, Golby, Hammond, Ilse, Manly, Myatt, Scott, Smith, Wadsworth, Wager, Whitfield, Youngson. **Coventry:** Crawforth, Hirons, Proctor, Raven, Smith, K. J., Smith, S. F., Wilshee. **Rugby:** Cave, Claridge, Daltry, Davis, Kennard, Smith. **Solihull:** Allen. **Stratford-on-Avon:** Floyd. **Sutton Coldfield:** Smith. **Tysoe:** Tysoe Church School. **Warwick:** Warwick County Museum.

WILTSHIRE. **Amesbury:** Campbell. **Bradford-on-Avon:** Smith. **Calne:** Ewing. **Salisbury:** Thompson, Stokes. **Trowbridge:** Bartlett, Weddell.

WORCESTERSHIRE. **Worcester:** Blake.

YORKSHIRE. **Barnsley:** Atkinson, Lees, Seago. **Boroughbridge:** Rae. **Bradford:** Benson, Binks, Briggs, Haxby, Hewson, Hodgson, Marson, Petty, Poole. **Catterick:** Leonard. **Dewsbury:** Buckley. **Doncaster:** Hyde, Smith, Waddington, Walter, Wright. **Guisborough:** Horner, Newson. **Halifax:** Collinson, Ogden, Schofield. **Harrogate:** Jesper. **Huddersfield:** Braham, Waugh. **Hull:** Clarkson, Duncan, Jones, Kenington, Rogerson, Wade. **Ilkley:** Miss Bartle. **Knaresborough:** Beck. **Kirk Ella:** Dibb. **Leeds:** Anderson, Barham, Coldcotes Beetle Club, Firth, Kennedy, La Touche, Miss Morton, Ramsden, Scott, Taylor, Thornton. **Middlesbrough:** Allen, Harwood. **Rotherham:** Cooke. **Scarborough:** Ellison, Owston, Walsh. **Sedbergh:** Rayner. **Selby:** Jackson. **Settle:** Malham Tarn Field Centre. **Sheffield:** Burton, Ford, Hamar, Marsden, Tyssen. **Wakefield:** Wyers **Withernsea:** Harding, Lewis. **York:** Bootham School Nat. Hist. Club.

OVERSEAS

AUSTRALIA. **N.S.W., Sydney:** Australian Branch A.E.S.

BELGIUM. **Brussels:** Vieujant. **Liége:** Le Clercq.

BRITISH CAMEROONS. **Mamfe:** Miss Ika.

CANADA. **Saskatchewan:** Shaw.

CANARY ISLANDS. Padron.

CHANNEL ISLANDS. **Jersey:** Gray, Packard-Rayne.

DENMARK. **Copenhagen:** Anderson.

FRANCE. **Basses-Pyrenèes, St Jean de-Luz:** Miss Heslop. **Nord, Lille,** Millon. **Paris:** Roudier.

GERMANY. **Hannover:** Hesselbath.

HAWAII. **Honolulu:** Krauss.

HONG KONG. Clayton.

JAPAN. **Tokio:** Hashimoto.

JORDAN. Trought.

KENYA COLONY. **Nakuru:** Townsend.

MALTA. **B'Kara:** Valletta. **Gozo, Victoria:** Xicluna.

NEW ZEALAND. **Wellington:** Gibbs.

PAPUA. **Port Moresby:** Slatter.

S. AFRICA. **Cape Town:** Duke. **Johannesburg:** Capener. **Zululand:** Newton.

TANGANYIKA. **Dar-es-Salaam:** Bell.

U.S.A. **California:** Sperry. **D.C.:** Shappirio. **Illinois:** Irwin. **Michigan:** Mrs Hynes. **New York:** American Museum of Nat. Hist., Keji, Pauley. **Ohio:** Ferguson. **Pennsylvania:** Murchie. **Wisconsin:** Koebert.

WEST AFRICA. **Calabar:** Christ Church School.

AES ADVISORY PANEL

Return Postage—The only requirement of members for the use of the Advisory Panel is that they must enclose stamps to cover cost of return of specimens, or stamped envelope for reply. Otherwise, reply cannot be guaranteed. It will also be of assistance if the membership number of each enquirer is quoted in all enquiries. Unless otherwise stated, advice is only given on the fauna of the British Isles. Enquirers must remember that Advisers are busy people: dead material should be sent during the winter months when evenings are less likely to be occupied with collecting or mounting their own captures. Where large numbers of specimens are to be named, the enquirer should preferably have this done at a Museum, where paid officials are employed to deal with such enquiries. A personal visit, moreover, will usually solicit more information than would be obtained by correspondence.

Labelling—Details of locality, foodplant, date, time and mode of capture and many other details are often essential to identification. All specimens should be labelled with such data, preferably placed on a small card on the same pin as the insect. In all cases details of locality will be treated as confidential.

New Advisers—There are still many subjects not yet covered by the Panel, and volunteers to assist in these departments are much desired. Offers should be sent to E. Lewis, 8 Parry Road, London, S.E.25.

Lepidoptera (Butterflies and Moths)

Identification of Macro larvae—HAMMOND, H. E. (423).

Varieties of Rhopalocera—RUSSELL, S. G. CASTLE (119).

Rearing Silkmoths—CROTCH, W. J. B. (1181).

Distribution and local lists, Macros and Micros—Lisney, Dr. A. A. (315).

Coleoptera (Beetles)

Books and collecting methods—Walsh, G. B. (24).
Identification, other than the groups named below—Tozer, D. (36).
Elateridae, identification and advice—Cooper, B.A. (‡).
Haliplidae and Pselaphidae, identification and advice—Pearce, Rev. E. J. (796).
Waterbeetles, identification and advice—Balfour-Browne, Prof. F. (340).

Hymenoptera

Parasitica, identification and advice—Kerrich, G. J. (551).

Diptera (Flies)

Identification and advice — Parmenter, L. (895).
Mosquitoes, identification and advice—Classey, E. W. (41).

Odonata (Dragonflies)

Identification and advice—Cowley, J. (771).

Orthoptera and Dermaptera (Grasshoppers, Crickets, Cockroaches, and Earwigs)

Identification and advice, British and foreign—Hincks, W. D. (531).

Plecoptera (Stoneflies)

Identification and advice—Syms, E. E. (406).

Hemiptera-Heteroptera (Het-bugs)

General advice and approximate identification—Shaw, H. K. Airy (545).

Insect Galls

Identification and advice—Manning, S. A. (1774).

Arachnida (Spiders)

Identification and advice—La Touche, Dr. A. A. D. (884).

Books

General advice—Syms, E. E. (406).
Advice on literature dealing with Lepidoptera—Stocker, P. P. (933).

Microscopy

General advice—Hirons, M. J. (444).

Photography

General advice, not colour or cinematography—Neal, E. G. (467).
Cinematography — Golding, D. P. (904).

Botany

Identification of foodplants—Shaw, H. K. Airy (545).
Selection, propagation and cultivation of foodplants and floral attractions—Dyson, R. C. (91).

Pests

Farm and garden pests—Cooper, B.A. (‡).
Stored products pests—Freeman, Dr. J. A. (986).

Beekeeping

General advice—Berry, J. E. (1072); Jesper, D. M. (1152).

Chemical Matters

General advice—Henstock, Dr. H. (209).

Insect Migration

General advice—Dannreuther, Capt. T. (60).

STUDY GROUPS AND CONVENERS

Cockroaches—Johnson, J. H. (1840).

Distribution of certain Lycaenidae (Blues)— Dyson, R. C. (91).

Distribution of Elephant Hawk—Johnson, J. H. (1840).

Ecology of Ponds—Leston, D. (1589)

Insect Galls—Manning, Stanley A (1774).

Larval Colours—Taylor, Peter G. (719).

Orthoptera (habits and distribution) —Michael, P. (748).

Silk Moths—Crotch, W. J. B. (1181).

Time of emergence from pupae—Bradley, P. (1360).

Weevils—Pearson, A. E. C. (1667).

HULL SCIENTIFIC AND FIELD NATURALISTS' CLUB

ERIC JONES (1699), the Hon. Gen. Secretary of this Club, has sent an account of an Exhibition held by the Club last autumn. In spite of pouring rain (or, possibly, because of it?—Ed.) the attendance was gratifying, the hall being filled to capacity at times.

Entomology was well represented. There was a display of leaves mounted on cards, showing the ravages of leaf-miners, varieties of the Magpie and other moths were shown, and also of the Ringlet and Common Blue. Living caterpillars interested younger visitors. Cases of *Coleoptera*, *Hymenoptera* and *Diptera* were on show and other cases illustrated the feeding habits of insects—omnivores, carnivores, vegetarians, etc. Examples of sexual dimorphism and of insect pests were displayed and a map showing where 'local' *Lepidoptera* occurred.

Other sections dealt with Botany, Conchology, Microscopy, Nature Photography, etc.

An item Mr Jones recommends to other Club Secretaries is refreshments, available at moderate charges,—if only for the benefit of members who may have to be in attendance all day.

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STAFFORDSHIRE LEPIDOPTERA IN 1950

Sugar—Sugar proved quite successful. The Peach Blossom (*Thyatira batis*) was quite common though, as they were very skittish, only one was caught. A Buff Arches (*Habrosyne derasa*) was also caught. Several of the *Plusiidae* came to *Buddleja* flowers, including the Golden Plusia (*P. moneta*).

Butterflies—White Letter Hairstreaks (*Strymon w-album*) were abundant in their usual localities and one was caught at Rolleston, where I have never come across it before. Green Hairstreaks (*Callophrys rubi*) were abundant at Beaudesert Woods and Cannock Chase.

Immigrants—The Clouded Yellow (*Colias croceus*) and Hummingbird Hawk Moth (*Macroglossum stellatarum*) were absent.

Smooth Bark *versus* Rough Bark for Sugar—I have had many more moths at sugar on smooth-barked trees (especially Holly) than on rough-barked trees. I think this disposes of a superstition with many entomologists that rough-barked trees are to be preferred. The Rev. J. Greene (*The Insect Hunter's Companion*, published in 1880) recommends choosing rough-barked trees for sugar.

T. A. STORER (1254*).
Burton-on-Trent, Staffs.

(Note:—Edward Newman in *The Natural History of British Moths* says: " Select a tree with tolerably smooth bark." Rags, flowerheads, thistles, etc., have all been recommended for the application of 'sugar.' As important a point as any is, probably, that the sugar is so placed that *boxing the moths* is as easy as possible.—ED.)

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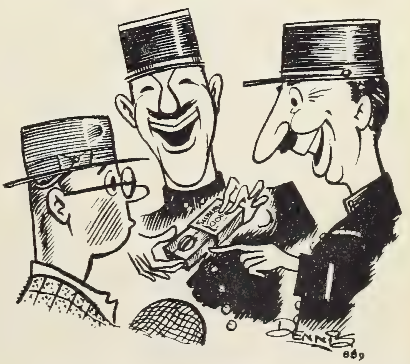
COMMENT

Dogs are not allowed on the beaches of Brittany ('It is forbidden,' runs the notice, 'to circulate the dogs') but there is no such ban on Colorado beetles, which at Saint Lunaire in September 1950 were to be found circulating in scores. The amateur coleopterist will be well advised to leave them alone, however, for the following reasons:—

1. The local policemen are completely unimpressed by them.
2. They will not in any case know what you mean if you describe them as *Scarabées colorades*.
3. They will roar with laughter if you show them a specimen in a matchbox.
4. It is a series offence to bring a live specimen into England.
5. Nor will the customs believe you if you point out that the beetle in your killing bottle is dead.



In view of the Frenchman's casual attitude to these pests (he simply shrugs his shoulders and says 'They eat everything, just like the Boche')

it is a wonder that the Channel Islands contrive to produce potatoes!

JOHN MOORE (146).

A TEMPERATURE EXPERIMENT WITH THE ORANGE TIP

The following experiment, though carried out in a somewhat haphazard manner and with small numbers, may be of interest and prompt members to further research.

In May 1949 I collected a few larvae of the Orange Tip (*Anthocharis cardamines* L.). These had all pupated by 17th June. I then divided the chrysalids into lots and subjected them to varying treatment in the refrigerator. The following table gives the periods, temperatures and dates of emergence. I do not know the exact temperature of the freezing compartment of my "fridge," but it is presumably somewhat below 32° F.

BATCH A.

26/6/49	45 degrees F.
2/7	32
3/7	45
5/7	32
7/7	45
10/7	normal
6/9	80-90 (later 50-60)
20/6/50	32-45
20/7	normal
10/9	indoors (abt. 60° F.)

Emerged:—9/9, 20/9, 30/9, 28/10 and 17/11/50.

BATCH B.

16/8/49	45 degrees F.
21/8	32
4/9	45
26/9	normal
6/10	80-90
overwinter ...	indoors (abt. 60° F.)
summer	normal
1/11/50	indoors (abt. 60° F.)

Emerged:—3/1, 4/1 and 14/2/51.

Batch C was treated normally and they emerged 20-22/4/50.

I had thought that cold followed by warmth would cause emergence in Sept. or Oct. But "A" came out after two artificial winters and "B" very tardily after one. No pupae died, but two butterflies failed to get clear of the pupal case. No variation was noticeable.

JOHN E. KNIGHT (94).

FEEDING AND STRIDULATION OF *METRIOPTERA BRACHYPTERA* L.

It is perhaps worth putting on record an observation that I made on *M. brachyptera* in the New Forest in 1947. On August 25th, at Bolderwood Bridge, near Brockenhurst, a specimen was watched for some time in a low thicket of gorse (*Ulex*), bramble (*Rubus*), ling (*Calluna*), cross-leaved heath (*Erica Tetralix*) and bracken (*Pteridium*). The insect was seen to feed on the flowers of the ling, and while doing so, and even while walking about, it stridulated intermittently. This simultaneous activity seemed rather curious, but it may be normal. The 'frequency' of the stridulation was roughly timed at 5-6 'beats,' or 'strokes,' per second. No reference to the stridulation of this species is made either by Lucas (1920, *Mon. Brit. Orthoptera*) or by Burr (1936, *Brit. Grasshoppers*). Further observations on the feeding habits are very desirable.

H. K. AIRY SHAW (545).

DEATH OF A BUTTERFLY

In the fitful October sunshine I watched a belated *Pieris brassicae*—a female—alight on a cabbage leaf. It landed rather uncertainly, for it had come, not to oviposit but to die. Slowly the wings canted over until the insect lay almost flat on its side. I picked it up: the legs waved feebly. Gently I replaced it on the leaf, and within a matter of seconds it had expired. Soon the fragile body would be gone—blown by the wind, shrivelled or devoured.

Death, even when not violent, usually comes quite suddenly to the insect: disposal follows almost as swiftly. Often enough, we see the tiny ova laid; we may watch the larvae hatching from the eggs, pupae yielding up their transformed contents. Birth, growth, metamorphosis we are permitted to study relatively often and fairly easily; but death, except when violent, is mostly hidden from human eyes. Even the corpse is seen but seldom, for nature has tidy ways and her scavengers are legion.

PETER MICHAEL (748).

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EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES BULLETIN

No. 128

AUGUST 1951

CATCHING MORPHOS

Seven species of *Morpho* occur in British Guiana, but with the exception of two, *M. menelaus* and *M. achilles*, they are rare. *Menelaus* is the bright blue butterfly that is used in the manufacture of jewellery and other fancy objects. *Achilles* is mainly black, with pale blue bands on both wings. Both may be seen at any time of year, but *menelaus* has definite seasons when it is common, April and to a less extent November.

It is impossible to walk about in tropical forests; movement only takes place along roads, which are very few, or by paths which have to be cut by the explorer, the implement used being a cutlass. Professional collectors lay out a system of radial rides, centering on a road, if possible near water. The idea is that the *Morphos* enter these rides, which are too narrow to be sunlit, and are attracted towards the bright patch of sunlight on the road, where the collector stands. One does not, of course, do any chasing, partly because it is too hot, and partly because butterflies invariably slip off into the forest when pursued. They have, therefore, to be brought to the collector, and this process is made easier by the use of a bait, which consists of a dead specimen fastened in a short cleft stick. By waving this at about waist level, the *Morpho* is attracted and can actually be made to fly into the net. This bait alone is quite enough for the ordinary collector; overripe bananas and similar methods may be used, but involve unnecessary trouble.

A few days' camping in the forest is a delightful experience; a lift in a lorry must be obtained, as there is a twenty mile journey. Lodging is in the Indian type of hut, a framework of wood covered with palm-leaves, and much more rainproof than one would expect. During the day many birds are to be heard, but seldom seen, although an extraordinary caterwauling noise may call one's attention to a party of toucans high in the trees. At night, frogs are to be heard; one big one makes a noise like a man shouting. In the early morning there are the howler monkeys, whose cry is not so much a howl as a roar. There is a stream nearby for drinking and washing, but food and bedding have to be brought.

8 a.m. to noon is the time when the males fly; females, which are much more soberly dressed, are more often seen in the afternoon. I never saw one laying, but expressed some eggs from a dead female; they were large, pale green and bun-shaped. One larva was given me, the only one I saw; it was grey with brown markings, and had several tufts of reddish bristles. The chrysalis was pale green and pear-shaped, with two small horns, and very small for the size of the butterfly. It died for no apparent reason, but was almost certainly *M. achilles*.

As regards the other species, *M. adonis*, which has a beautiful pink and pale blue iridescence, is not infrequently seen; it flies high, but will sometimes come down to a *menelaus* bait. I saw only one *hecuba*, flying at a great height; this is one of the brown species, and the largest of the *Morphos*. The other three, *perseus*, *rhetenor* and *deidamia*, I did not see.

J. P. Shaw (1204).

JANUARY EMERGENCE OF LARGE WHITE

A small male specimen of *Pieris brassicae* Linn. (the Large White) emerged in the living room of a dwelling-house at Fordingbridge, Hants., on January 16, 1951.

This early appearance was due to the fact that the larva had pupated in a top corner of the fireplace, just beneath the mantelpiece, and the warmth afforded by regular fires had the effect of forcing the pupa.

The imago measured 61.3 mm. from tip to tip of the forewings, and was in perfect condition, without any trace of the wing-distortion that is, in my experience, often prevalent among forced specimens.

Paul H. Holloway (429).

PROBLEMS OF LOCAL VARIATION

Part II

(*Continued from p. 45*)

I know of five major colonies in North Cumberland of *Euphydryas aurinia* (the Marsh Fritillary) and they raise some interesting problems concerning local forms. I have also found the species in two other places in the area; but it appears to be so very restricted and scarce in these, that they have been omitted from the present discussion. There may be other colonies in the same parts: the problem may well become more interesting still if any are found. It is hard to believe that these North Cumberland colonies have been isolated from each other for very long—probably only since the neighbourhood became extensively cultivated and interfered with by man—yet the present differences between the colonies are very marked. It may be interesting to record a few facts about each of them.

(A) Colony A is at an elevation of about 200 ft., in the restricted area of a large marshy field by the side of a wood. Yet in this area its abundance is almost fantastic. It is literally impossible to take a step without disturbing at least two or three specimens. The range of variation is, as might be anticipated, extreme, almost all possible sizes, shapes and colour patterns being found. A characteristic aberration (ab. *suffusa*—see Frohawk's *Varieties of British Butterflies*, Pl. 17, fig. 3) has much more rounded and broader wings than the type and is always associated with aberrations in the neuration—the nervures breaking up into many twisted little branches towards the edges of the wings. Other specimens tend towards ab. *albafasciata*, the pale markings running to a greater or lesser extent into streaks. In this form the wings are longer and narrower than in the type. In forms more natural as regards patterning, the colour is very variable, ranging from unicolorous specimens, through highly variegated forms of the *præclava* type, to blackish examples with very heavy markings. The size also varies to a remarkable degree; but the greater tendency is towards specimens smaller than the type.

(B) Colony B is at an elevation of about 50 ft., four and a half miles north-west of Colony A, and is situated in moorish ground with Bog Myrtle (*Myrica gale*) and, curiously enough, a certain amount of Bird's Eye Primrose (*Primula farinosa*)—a strange station for the latter plant. There are one or two marshy fields adjoining this habitat and in them *E. aurinia* is also found, so that the extent of the area in which it occurs is somewhat larger than in Colony A. A greater contrast between the two colonies could hardly be imagined. In Colony B the species is by no means plentiful, though firmly established—it has been known for very many years. Variation hardly exists at all; but the vast majority of the specimens are quite unmistakable, their size being large and the ground colour a bright orange-red with very prominent yellow markings. It is not easy to describe their appearance accurately, but it is striking and characteristic. I have never seen specimens quite like them elsewhere —not even in Colony A, in spite of its range of variation.

(C) Colony C is at an elevation of 50 ft., 12 miles south-west of Colony B, and is situated at the source of a sluggish stream. The specimens from this colony are mostly strongly marked and many of them show a curious netted pattern, since the contrast between the ground colour and the paler markings tends to be very slight and both colours merge into one another instead of remaining distinct. I have seen specimens like this in Colony A, but in Colony C they are characteristic. One could not say, however, that specimens from Colony C are unmistakable (as they can be said to be from Colony B), and their size is quite normal. Variation seems to be slight, being confined chiefly to the intensity of the patterning.

(D) Colony D is almost at sea-level and very close to the sea, two-and-a-half miles west-south-west of Colony C, and situated at the edge of a moss. It is a fine and flourishing colony, and the same remarks can be made about the specimens from it as were made above under C—in fact, the two colonies are close to each other and seem more likely to be two parts of the same colony than do any of the others in North Cumberland. But there is more variation than in Colony C. Though specimens with

the same netted appearance occur, the form is less constant; and, most curious of all, ab. *suffusa* occurs there, although rarely. This form, as explained above, is somewhat of a freak, and one had imagined that it was confined to Colony A, where it survives owing to the extreme abundance with which the species reproduces itself there. It is strange that it should occur in Colony D which is the furthest removed from A and in other respects unlike it. It would be interesting to know if this freak form is found anywhere outside Cumberland. If so, its occurrence in Colony D is not surprising; but it seems more likely to be a freak which has arisen locally (and perhaps quite recently) and is able to maintain itself only because of favourable local circumstances. The neuration is sometimes so irregular that the specimens can hardly fly; and in any case this form is far less strong on the wing than the type. Reports of this or a similar form from any other part of the country would be most interesting and might help to throw light on the mystery of its occurrence in Colony D as well as in Colony A.

(E) Colony E is at an elevation of 950-1000 ft., thirteen miles south-south-east of Colony A, and is situated on sloping upland pastures, its range appearing to coincide with the Bird's Eye Primrose, mentioned under B, though here the plant is in a normal habitat and very prolific. This colony is extremely flourishing and healthy, specimens being very abundant, though not overcrowded to the extent of Colony A. In fact, the area in which it occurs is much wider. Nevertheless, in spite of the abundance, variation is almost non-existent, and apart from its setting of great natural beauty, it is in itself the least interesting of all the Cumberland colonies. Almost all the specimens are as typical of the normal English form as one could find anywhere.

The foregoing notes prompt various questions. For instance, how long have these colonies been isolated from each other? In spite of the fact that specimens never seem to wander from their haunts, has there in fact been in the comparatively recent past some such wandering to account for e.g. the appearance of ab. *suffusa* in Colony D? How comes it that Colony B, though numerically small, and only four and a half miles from Colony A, is so markedly distinct? Why is it that Colony A should be so overcrowded, while Colony B is so sparsely populated in spite of the fact that the foodplant is exceptionally plentiful and luxuriant there? Why should Colony E show so little variation in its large population? Other questions will presumably occur to readers. Our present knowledge is probably insufficient to provide a satisfactory answer to all these questions, but the species is a highly interesting one which would repay intensive study. One would like to hear whether a similar general situation with similar divergences in neighbouring colonies is to be found in other parts of the country. Such information can be provided only by those who know any such area intimately. Drainage and an increase in cultivation have resulted in the loss of two or three Cumberland colonies in the quite recent past; the species is in much danger in many of its haunts, because the type of habitat it favours is often land which with a little drainage can be turned to agricultural use. This is particularly obvious in Cumberland, where cultivation extends to the very edge of the colonies, which exist on little pockets of land so far ignored by the farmers. The species should be adequately studied while it is still with us in numbers, though one sincerely hopes that this fascinating little butterfly will be spared indefinitely to add interest and beauty to our countryside.

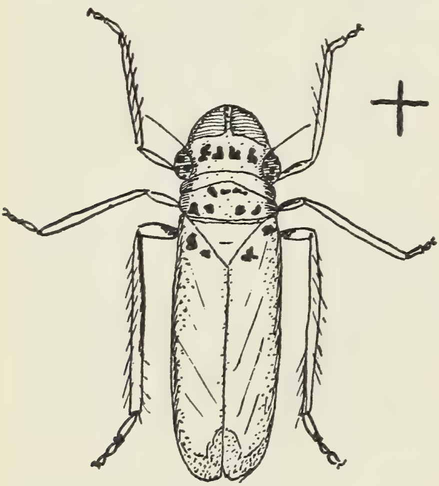
J. H. Vine Hall (1520).
Hutton Roof Vicarage,
Kirkby Lonsdale,
via Carnforth, Lancs.
(*new address*).

(Dr E. B. Ford in his chapter on " Evolution " in *Butterflies* (New Naturalist Series, No. 1, Collins, 1945) refers to the watch he and his father kept over a Cumberland colony of *E. aurinia* through a period of nineteen years. One wonders if it was any of the colonies cited above. Dr Ford considers that the Rev. J. H. Vine Hall's interesting colonies deserve specific further study, bearing in mind the most recent ideas on ecology, genetics, and evolution. We apologise for mis-printing his name on page 45.—Editor.)

MORE NOTES ON HEMIPTERA-HOMOPTERA

Tettigoniella viridis L. and *Euacanthus interruptus* L. are both members of the sub-family *Tettigellinae* of the Hemiptera-Homoptera.

In marshy fields in late summer large numbers of *T. viridis* often occur, especially if there is an abundance of the rush *Juncus effusus*. It is gregarious and, in many localities, one cannot put down a foot without literally hundreds of them rising into flight. *E. interruptus* is common also in similar situations. It is not unusual to see several specimens of each species feeding or roosting on the same stem. They are well worth studying.

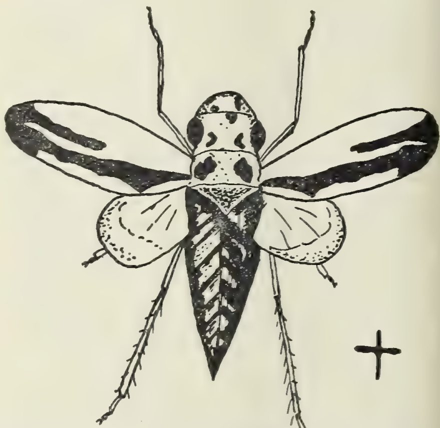


Tettigoniella viridis

TETTIGONIELLA VIRIDIS

The male is rather smaller than the female and, when living, is blue, with a bloom or sheen on the elytra and abdomen. The vertex is pale biscuit colour and on either side, near to the eyes, are two swellings, each continuing forward to the frons and bearing a number of dark brown striations. The ocelli are easily discerned and between them there are two dark curved markings. The eyes are pale ochreous, marbled with dark spots. The pronotum is greenish yellow with some rather dark markings on it. There are two terminal spines to the femora and the tibiae are fringed with short spines. The elytra are blue, having at the tip a brown and membranous patch devoid of all blue colouring.

The female is large, with bright green elytra. The pronotum is also green. The elytra are spotted with black on the anterior parts; and the costal nervure is generally paler than the rest of the elytron. Var. *arundinis* has the nervures edged with black. When at rest or feeding, these insects all congregate head to abdomen on the stem, and their excreta are continually voided.



Evacanthus interruptus, Linn.

EUACANTHUS INTERRUPTU

This insect is rather highly coloured, although very variable. The head is the broadest part of the body, for the thorax and abdomen taper backwards to quite a narrow terminal segment. The scutellum has a light border and a darker centering. The elytra are yellow, with black tips. There is a very irregularly shaped black band running from the base to the apex of the elytron. A shorter one, tapering as it recedes from the apex, crosses the corium. The legs are dull yellow, and the hind tibiae are strongly spined.

M. Salmon (1577*).

LOCAL NAMES OF BRITISH BUTTERFLIES

H. B. Sargent (1189), Rose Cottage, Breage, Helston, Cornwall, is compiling a list of local names of British butterflies. He will be most grateful if members who know of any such names will pass them on to him.

AN EXPLANATION

In *AES Leaflet* No. 6, "Collecting Beetles associated with stored Food Products," Mr E. B. Basden described and figured an ingenious refinement of a simple pooter of his own devising. In *AES Leaflet* No. 5, "Collecting Flies" (*Diptera*)" Mr L. Parmenter alluded to a pooter, which he expected to be illustrated by a line-drawing done by Mr B. A. Cooper much earlier, but which was in fact illustrated by the same drawing as that given in Mr Basden's Leaflet. A reviewer has given credit for the design of the dust-trap, quite inadvertently, to the wrong person.

Mr Trevor Trought writes:—"Mr Basden's account of this pooter was so modest that there was no indication that it was his own idea. His account, in fact, almost gives the impression that it was not. As Editor at the time, I had, therefore, no inkling of the true facts. I should naturally have given due credit, where credit was due. When there was a question of selecting from among the blocks belonging to the AES a suitable diagram to illustrate a pooter in Mr Parmenter's leaflet, I just selected the one I thought to be the best. Mr Parmenter did not even see the diagram until his leaflet was printed off, as the block was set up with *AES Leaflet* No. 6 all the time Mr Parmenter's leaflet was in proof. I am sorry that either Mr Parmenter or Mr Basden should have been inconvenienced or worried over this contretemps, and hope that this explanation will clear the matter up satisfactorily for both gentlemen."

Will members who have copies of *Leaflet* No. 5 please insert on page 1 a footnote stating "The addition of a dust-trap to the pooter is Mr E. B. Basden's idea."

They may also wish to note that the "size crosses" of the lower figure on Plate IV and the upper figure on Plate VI should be interchanged.

W. J. B. C.

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LETTERS TO THE EDITOR

Dear Sir,—I was most interested in the types of breeding cages which were described in "The Amateur Entomologist," Volume 9, but I was surprised that none of your correspondents made use of Windolite. I find it in many cases handier than glass in that it is unbreakable, easily stapled on to a wooden frame, and (when kept clean) allows the passage of ultra-violet rays. With a little patience it is easily bent round and stitched with fine wire into cylinders for sleeving, and is then sufficiently rigid to close the ends with muslin stretched over and held by an elastic band. I have used it for some years with considerable success. — Yours faithfully,

R. W. D. Carr (1175).

Dear Sir,—May I reply to Mr G. C. Holroyd's very fair comments (p. 28) on my article "The Well-Set Moth." To take his second point first. What he says is, of course, perfectly true. When I wrote, I had in mind "The Juniors" who are often impatient! I remember myself thinking (many years ago) "Oh, well! that Eyed Hawk that I took off yesterday seems all right; I think the Death's Head might come off to-morrow." That way lie springing and many other evils.

The first point that Mr Holroyd makes requires a little more comment. Our previous Editor, in his note, hit the nail on the head, but did not drive it far enough. Probably Mr Holroyd did not know that I was writing from Africa, where a large proportion of the moths one takes are (at first) unknown to the collector; and species new to science are always cropping up. No moth, therefore, even though a bad specimen, can be neglected. There are a number of such imperfect specimens in my collection—some even without abdomina—these having been removed for preparation and examination of the genitalia by experts at the B.M. or in S. Africa, or even by my humble self. This process is often absolutely necessary for the determination of species. The moth bears, of course, on its label all particulars of the whereabouts of its missing parts: and is, therefore, for scientific purposes, a complete specimen, even though parts of it may be thousands of miles away. When the imperfect imago is of a known species, the bad specimen is discarded when I obtain good ones; but in the case of a new species, even if I acquire a long series of perfect bred specimens, the original "type" from which the species has been described must, even though thus mutilated, be most carefully preserved.

Of one specimen (a small Geometer) I fear Mr Holroyd would thoroughly

disapprove! It consists of one forewing, and nothing else. This was spewed derisively in my direction by a bat which had beaten me to it, and I have never yet seen anything to match it, though I live in hopes!

"From the purely scientific angle" (to quote Mr Holroyd), condition is just as important as for a "Display" collection: perhaps even more so. But it is not always capable of immediate attainment. That is why I used the words which Mr Holroyd dislikes.

I envy him his laurel jar, which I well remember as a most useful article. We have nothing of that sort here. My moths go from the killing bottle into a jar containing a horrible mixture of cedar-sawdust, water, naphthaline, and a drop of creosote, which keeps them beautifully soft.—Yours faithfully,

A. L. H. TOWNSEND (1691).

Dear Sir,—It is heartening, indeed, to read at last a letter by two prominent entomologists condemning the misuse of Light Traps, particularly the M.V. types which have recently sprung into popularity—with as devastating an effect on the insect world as an atomic bomb on mankind.

Surely the use of such powerful traps should only be allowed by research workers, etc., and the unscrupulous collector of rarities left to his meagre 100 watt! But I fear this is wishful thinking—in spite of protests the lights will go up and the insect population go down; and slowly, one by one, the names of many rare species will be found only under the heading "Extinct."

Let some of us this season take a hint from Mr Hammond's excellent letter in the June issue—breed more, collect less. This, I know, is not always easy to do, especially in these days when living accommodation does not allow space for the purpose. Collectors living in towns find it difficult to obtain food plants, etc., but in spite of all this I feel sure with more effort on the part of us all we can at least do a little to help conserve our native fauna or replace a few of the species with which we have filled (?) our cabinets, by breeding *and* freeing in suitable environment a percentage of each species bred during the season.—Yours truly,

F. R. SUTTON (538).

NOTES ON ELEPHANT HAWK LARVAE

It would be a great help to the entomologist if an abundant supply of a plant growth was sure to contain the caterpillar which fed on it, if he visited it at the right time of day and season. Unfortunately, magnificent beds of Willowherb (*Epilobium*) do not always indicate the presence of *C. elpenor*, and so until we know what rules, if any, govern insect distribution, we shall have to rely on the observations made by successful collectors. Many caterpillars are easily found once a few little points are observed; it seems that each species has some Achilles heel by which the diligent collector can overcome it. Last year (1950) I have paid particular attention to the Elephant Hawk larva and I have collected, by searching, thirty-five specimens at varying stages. Only one of these was green, the rest were different shades of brown.

My first plan was to walk rapidly from clump to clump of willowherb half an hour before sunset. I chose lanes and waste ground where small clumps were common. On August 21st I found eight three-quarter grown larvae in a lane 440 yards long. Darkness prevented my seeing more, and I found torch light useless for searching. All these larvae were feeding on leaves and seedpods high up the flower stalk. I worked a railway embankment the following evening and found only three larvae and these on the same clump.

The next two or three days were wet and windy, so I was unable to search in the evenings. However, on August 24th at 12.30 p.m. I was amazed to see four larvae resting on the flower stalks of one clump of willowherb near an allotment wall. They were quite open to view from the main path, and about three feet above the ground. This was the only occasion when I found more than three on one clump of willowherb; usually only one is found, alone in its glory. The weather was warmer, and I continued to find larvae just before sunset at the rate of about six per working hour. On September 5th I searched an old coal tip in the afternoon and without difficulty found four larvae, 1½ inches long, resting on the main stem about one foot above the ground. They were nearly black and were quite conspicuous. The sun was shining, but not directly on to the larvae.

The last larva was found on September 13th just before sunset, as usual sitting on the flower stalk pulling a leaf towards it. It was only 1 inch long, and I found it was "ichneumoned." I found two white ichneumon larvae inside it, unidentified. I was surprised to find two, because usually only one large ichneumon fly emerges from the neatly cut off "neck" of the pupa case.

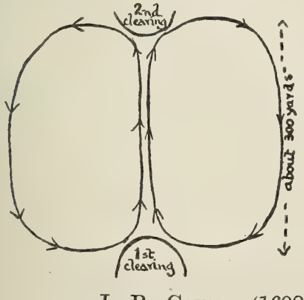
Every larva had pupated by September 23rd and I found no more after that date.

Some collectors say that the easiest method of finding *elpenor* larvae is to run the plant stem through one's fingers. The large creature is then easily felt and pulled off. I should say that once one has been found on a clump it is inadvisable to waste any more time on it: better to get to the next quickly before the light goes. I should also advise searching *Epilobium* (*Chamaenerion*) *angustifolium*, because I found all but one specimen on that plant. The exception was found on *E. hirsutum*, but within a few feet of a clump of the more usual species.

J. H. JOHNSON (1040).

BRIMSTONE BUTTERFLIES PATROLLING

One Spring (May 17th, 1950) I noticed in a small wood near my home (in Clifton, Bristol) that two male Brimstones (*Gonepteryx rhamni*) had taken a certain path of flight which ran through the wood something like a figure of eight. They met at one clearing, flew together to a second clearing about 300 yards away, and then separated. Each made a semi-circular journey on either side of the centre path and then met again at the first clearing. They repeated this several times. The diagram illustrates this.



J. B. CAINES (1692*).

INSECTS AND MOSSES

While indulging in my other hobby, bryology, I frequently come across insects which are quite obviously using the moss carpet or tufts as their habitat. I imagine that most of the insects display little or no preference for the species of moss in which they move; but some of my observations suggest that there may be some dependence of certain insects upon certain mosses.

My first pointer was a tuft of a common moss, *Ceratodon purpureus* (Hedw.) Brid., which had lost quite a number of the capsules and on which nearly all the peristomes had vanished (the peristome is a fringe of delicate teeth surrounding the mouth of the capsule). As the undamaged capsules were still in fine condition, I could only conclude that the damage had been done by some animal whilst feeding. Of course, something other than an insect may have been the culprit, but I feel that the smaller insects could well come under suspicion. This instance gives rise to a general query as to the extent to which mosses take a part in insect diets. Are some insects specific in their moss diet, with a consequential limitation of their distribution?

Early in the spring of 1950 I was searching a patch of *Hypnum cupressiforme* Hedw. and found large numbers of Flea Beetles (*Phyllotreta*), a population density of about five to a square inch. Clearly the moss mats on the trunks of trees in woods adjoining farmlands could be reservoirs from which the spring and summer infestations originate. If it can be confirmed that the beetles tend to hibernate in *H. cupressiforme* or similar mosses; then farmers might reduce infestations considerably by suitably timed spraying. Possibly other insects depend upon the conditions existing in certain types of moss mats, tufts or carpets for their existence. Possibly; but do they?

I have noticed that, in this district at least, the common water moss, *Fontinalis antipyretica* Hedw., harbours more pupae of the *Simuliidae* (*Diptera*) than any of the other plants in the stream. Why?

Such points as these and, without doubt, others that have come to the notice of members, indicate the need of a group to examine the relationship between mosses and insects. I am willing to act as secretary to such a

group and to bring together all information that can be produced.

R. S. George (1402).

NEED COLLECTORS BE HOOLIGANS?

Last autumn it was reported to the Protection Committee of the Royal Entomological Society of London that in a single too-well known woodland area in Kent this sort of thing was happening. Fences surrounding Forestry Commission enclosures were being broken down; gates being left open and allowing access of vermin; fires were being caused by users of light traps and picnickers; aspens and sallows of all ages, in the enclosures and on the roadside, were being "thrashed to pieces"; one and two year old shoots of oak stock in woods and enclosures were being removed; one collector boasted he had collected 70 *Minucia lunaris* larvae before lunch, and then said he didn't know what he was going to do with them, as the food plant didn't grow anywhere in his neighbourhood. Must this sort of thing go on? Most of it is sheer vandalism, though due, perhaps, to thoughtlessness. But whatever the cause, the result is not only discreditable to all collectors (even though due to only a few), but also a very great handicap to the work of the Protection Committee. This Committee has been to much trouble to establish friendly and co-operative relations with the Forestry Commission, who control a large part of these woodlands. Can it blame the Commission for doubting their motives when entomologists beg the Commission to spare this, save that, not to fell here or clear there, to plant hard woods and not conifers, and so on; and simultaneously they themselves destroy the insects they profess to want to save, and make thorough nuisances of themselves into the bargain? It would be a pity if these woods were closed. Would it not be most appropriate that collectors should deal suitably at once, and on the spot, with their own black sheep whenever they meet them?

N. D. Riley
(Secretary of the Protection Committee).

REVIEW

Guide to British Insects, by B. D. Moreton, with 96 figures (several species often shewn under one figure), consisting of line drawings and actual photographs. 188 pages, 5" × 7½". Published by Macmillan & Co. Ltd., London, 1950. Price 8/6.

This is a most interesting little book that certainly does live up to its title. If more amateur entomologists had read a book like this as their initiation into the study of insect-life, there would have been much more interest shewn in the many less popular orders.

There is a very thorough introduction on structure and life history, followed by a Key to all of the twenty-three Orders of Insects in the British Isles. These Orders are then individually described under the sub-headings: Recognition, Metamorphosis and Some Features of Appearance; and each has numerous illustrations covering their various sub-orders and families, with the types of larvae. A chapter deals with books for further reading; there is a glossary of technical terms; and an index of popular and scientific names. This is a book I would recommend to all amateur entomologists who have resisted the temptation to be specialists: it is worthy of a place in any library for reference alone.

P. J. G.

FIELD MEETINGS

Bradford Microscopical Society invite AES members to join them for the following visits:—

August 5th. Meet at Odsal Top at 2 p.m. for Judy Woods. Bus from Town Hall 1.42.

August 22nd. Meet at Haworth Road Bus Terminus at 7.30 p.m. for Miles' Rough Pond. Bus from Forster Square at 7.15.

A REMINDER

Have you yet persuaded at least two people to become new members?

Printed by T. Buncle & Co. Ltd., Arbroath, and published by the Amateur Entomologists' Society, 1 West Ham Lane, London, E.15. 1951.

Preliminary Announcement

AES
Annual Exhibition

The Annual Exhibition will be held in London

on SATURDAY, 22nd September

Exhibits of members' specimens (living and set), equipment, apparatus, photographs, etc.

Demonstrations   Talks by Experts

"Surplus" Table for the sale of members' spare ova, larvae, imagines, equipment, books, etc.

Entomological Traders will be in attendance.

Full details will appear in the September *Bulletin.*

Enquiries should be addressed (enclosing stamped envelope for reply) to—

The Hon. Meetings' Secretary (K. H. BOBE), 19 Hengist Road, London, S.E.12.

Why not include the Exhibition in your Festival visit to London?

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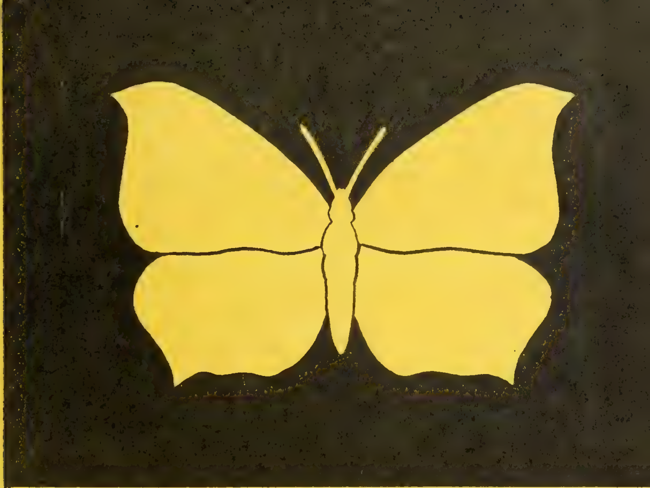

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES BULLETIN

No. 129

SEPTEMBER 1951

INCUBATION OF INSECTS

Recently the Editor was lucky enough to acquire Réaumur's " Mémoires pour servir à l'histoire des Insectes ". The first memoir of the second volume, published in Paris in 1736, refers to his experiments on incubation. Having proved to himself that chrysalids breathe and, if confined, give out an ascertainable condensation of fluid, Réaumur goes on:—

" It is, therefore, certain that the perfect insect will not be able to break out of its case until its parts have become sufficiently solid and hardened; that heat is the agent most likely to cause the evaporation of the excess liquid in which the limbs of the insect are bathed; and according to whether this excess is removed more rapidly or more slowly, the perfect insect will retain for a less or greater time the form of the chrysalis.

" This simple principle has led me to conclude that we could at will shorten or prolong the total life, not only of those species of butterflies which have a variable life span according to the month of the year in which the eggs are hatched, but also those which in nature have hitherto lived a nearly invariable length of time; and, indeed, more generally, all those insects which metamorphose into chrysalids or nymphs which have no need to feed, such as many species of beetles and flies.

" It was necessary to find out whether those insects which pass the whole winter, and sometimes as much as eight or ten months, in the pupal state, have to live that long in that condition and whether there was any risk in accelerating a rate of development which Nature had intended to advance little by little. All that was necessary was to keep various species of chrysalids through the winter in an atmosphere as warm as a pleasant spring to see the effect produced upon them. This experiment, simple as it sounds, would have been very difficult to carry out, but for the existence of two magnificent heated greenhouses recently constructed in the King's garden. . . .

" The outcome was precisely that which I had envisaged. Butterflies appeared in my boxes in the middle of winter, some of them breaking through their chrysalids at the end of ten or twelve days; others stayed in the pupal state for three weeks and yet others for six weeks and more. These variations were what I had foreseen. Among the chrysalids were some from which the perfect insects would have emerged in May, but others were not due to appear until August or early September. Five or six days in the greenhouse were equivalent to a month had they been exposed to the rigours of the air or hidden below the soil.

" To accelerate the development of insects hidden in the form of chrysalis or nymph, one needed a source of heat more constant than could be provided by the stoves (*poêles*) of the greenhouses; which would be less expensive to run and have quicker effects. Until now, hens (*poules* — did the word-association help?—Ed.) had sat upon nothing but eggs, but it struck me that they might very well hatch chrysalids and nymphs instead of chicks. One couldn't put the pupae directly under a hen, because of the great difference of size between them and an egg; besides, they are less firm than the smallest eggshell, and would be squashed by the mere weight of the hen or by her movements. But when a hen is broody, she shows no great discernment and will sit on rounded stones if they are put among the eggs. I had little doubt that she would sit on glass balls elongated to the shape of eggs and even rather larger. If in a glass egg there were placed a chrysalis, she would sit on the false egg and so upon the chrysalis. The pupa would be protected by the glass walls against the hen's weight, just as the chick-embryos are by the eggshell; but they would benefit just the same from the warmth of the hen.

" To try the experiment I took a hollow glass ball of suitable size and cut an aperture through which to insert the chrysalids. Those which served for my first experiment were spiny caterpillars from nettles which

had attached themselves by their tails to the paper which covered the box in which they had been reared. (Obviously *Vanessids*—Ed.) Without dislodging them, I cut eight little squares of paper from which they remained hanging centrally; and I gummed the papers on the reverse side and carefully applied them to the internal surface of the glass. I packed the chrysalids together as closely as possible. When the glass egg was placed in position, they were hanging down as if from the roof of a vault. I then sealed them in with a stopper of cork. But not wishing to cut off all communication with the outer air, I devised a way of providing it by cutting a slit lengthways in the cork, which left a little space between the contours of the aperture and the cork.

"All being thus prepared, I put the glass egg among some natural ones on which a hen had already been sitting for several days. Next day I found that she had moved the unnatural egg to the edge of the nest and she always kept it there; nevertheless she kept it nicely warm. The effect of the heat appeared from the first day the interior surfaces of the glass were covered with vapour or rather droplets of very clear water which had been produced by the considerable perspiration of the chrysalids. I removed the cork to let the humidity evaporate, which otherwise might have injured them had it remained. After a few minutes, when the egg had dried out, I put back the cork and put the false egg back under the hen. Neither next day nor later did I see any more vapour within. The great sweating had been completed in less than twenty-four hours. At length, at the end of four days, I saw the first butterfly ever to appear to be hatched by a hen! It had taken four days instead of a fortnight for the quickest of the same brood to emerge out of doors during a very favourable spell of weather."

Readers will remember that Réaumur was the inventor of a thermometric scale which is still used and bears his name. He tried to measure the temperature under the hen and found it rather variable. but seldom less than "31 degrés & demi au-dessus de la congélation," i.e., 103°F. He also found that the heat was too great for various dipterous pupae he put within the glass egg.

W. J. B. C.

ANTS AND BEETLES

On many occasions last summer I saw individuals of *Myrmica ruginodis* Nyl. and *Poecilium alni* Linn. consorting in a strange manner.

A colony of about seventy of the beetles existed on a row of hazel sticks which my father was using as bean sticks. The ants were common in the garden. Both species could be seen running actively over the bark of the sticks any time during any sunny day and there were a number of meetings between the two. At every meeting approximately the same procedure was followed. The beetle would immediately cower against the surface of the bark with its antennae lying along its back. The ant, or even several ants at one time, would then thoroughly explore the whole surface of the beetle's body time and time again. The investigation often lasted well over a quarter of an hour, but was sometimes broken by short lapses when the ant would stop its examination, move off for a few steps and then return to continue as before. On no occasion did I see an ant bite the beetle. Eventually the ant would move off; but the beetle rarely shewed any signs of life for the next two minutes. Then a routine was followed of slowly crawling away in erratic circles. The beetle appeared to suffer some loss of control of its legs and normal activity was not restored for about three minutes.

I sent specimens of both to the B.M. (N.H.) for confirmation of my identification of the beetle and for identification of the ant, and received a reply from Mr. Yarrow, who said:—"I can find no record of associations, amicable or otherwise, between Longicorn beetles and ants. The species of ant concerned is normally pugnacious and inquisitive, and, if I remember correctly, many Longicorn beetles sham death when disturbed. I think that this combination must be the explanation of your interesting observation."

The specimen I sent to Mr Yarrow exhibited loss of leg control by holding its right 2 and 3 legs rigidly horizontal for some moments before it regained its normal behaviour.

R. S. GEORGE (1402).

AES ADVISORY PANEL

Will members please add to page 82 of *Bulletin No. 127* under the heading "Microscopes" the name of Mr. D. H. HEPPELL (1690) who has kindly offered his services.

SPRINGING, DROOPING AND CURLING

(*Continued from Bulletin, Vol. 9, p. 96.*)

Curling—I presume by this is meant the curling up of the tips of the wings or of the margins of the wings, particularly the dorsum and/or tornus. In my experience this trouble is almost always due to the fact that the specimen has been killed too soon after emergence from the pupa: it is probably due to an unequal shrinkage of the upper and lower membranes of the wings. The only preventative is care not to kill the insect too soon after emergence. Curling may sometimes also be due to the insect being imperfectly relaxed when it is set. This point has been discussed earlier. Less often such curling may be due to damp. Once such curling has manifested itself—if it is due to premature killing—it is almost impossible to rectify it entirely; but repeated relaxing with a liquid relaxer and re-setting four or five times at two monthly intervals will improve and in some cases rectify it. If it is due to damp or the insect being insufficiently relaxed when it is set, a single relaxation with a good relaxer and re-setting will probably put matters right. In really desperate cases a bristle (thick for large insects; fine for small) or paper or card braces attached to the wings on the underside with liquid cellulose or glue will greatly improve matters, the thickness of the card or paper depending on the size of the insect. Another form of curling which is sometimes very troublesome in specimens which have been stored in papers for some time, becomes apparent when such specimens are relaxed and set. It takes the form of a curling upwards and backwards of the extreme edge of the costa of the forewings, most frequently in butterflies and particularly in the *Satyridae*. I have found no remedy for this nuisance, except extreme speed in setting after removal from the relaxing tin and the immediate application of a wide strap or brace covering the whole of the wings. At times such curling becomes apparent within a few minutes of removal from the relaxing tin—however long the specimen has been in the tin—and once it has started it is impossible to put it right without replacing the insect in the relaxing tin for a further twelve hours or so.

Drooping—This may be of two forms. One is the reverse of springing and is due to the same causes; particularly where the insect has died and rigor mortis has set in with the wings folded downwards below the body. The remedy is the same as for springing. The other form of drooping—perhaps more frequently met with—is due probably to damp; but this is by no means the certain cause, since under equally damp conditions, with a very high humidity and temperature, some specimens become affected while others, often of the same species, do not. There is some indication that it may quite possibly be due to the precise angle at which the insect is pinned into the groove of the setting board and the precise pressures exerted on the bases of the wings by the edges of the groove as a result. These pressures may slightly displace the wing muscles and cause drooping to develop. Keeping the collection very dry and avoiding great fluctuations of temperature, particularly in the upward direction, is the best solution. Relaxing and resetting will generally cure the trouble, but insects affected by drooping will generally give trouble again if allowed to get damp or subjected to fluctuations of temperature. Placing specimens in a temperature which has suddenly been raised from normal will generally result in severe drooping, which remains to a very great extent after the temperature is returned to normal. Generally speaking, if drooping is to be prevented, insects must be set when in a thoroughly relaxed condition and great care must be taken to ensure that the wings lie flat on the board, with no undue pressure on the costa of the forewings. The collection must be kept in a dry atmosphere, if necessary by the use of chemical drying agents—silica gel being perhaps the best—and at a level temperature. Even slight quantities of water vapour or fluctuations of temperature will at times cause drooping in some specimens. Specimens should be left on setting boards at least a full month: and it is always advisable to remove them in an unheated room, when the barometer is high, and transfer them at once to cabinet or store box. Store boxes should not be kept open or drawer covers removed for any length of time on damp days or when the barometer is low or if there is a fire of any kind in the room.

Most drooping is probably due to a combination of damp and the angle at which the insect rides on the pin in the groove when it is being set. If the angle is hit off correctly the muscles of the wings set firm and remain unaffected by damp; but, if the muscles lock incorrectly while the setting process is taking effect, damp will loosen them and cause drooping. My collection in India would appear to bear out this theory; since if damp were the only cause of drooping, my whole collection should have drooped until the wings assumed the shape of an inverted " V," because the temperature for many months in the year was over 90° and the humidity sufficient to cause mould to grow on my boots almost over-night. This, however, was not the case, and many of my specimens are still as flat as they were the day they came off the boards, in spite of being subjected year after year to the conditions mentioned; while others drooped severely. Where drooping became a nuisance, I found that relaxing and resetting generally cured it and an application of liquid cellulose was most helpful, applied to the bases of the wings as mentioned previously.

The use of liberal quantities of silica gel will prevent mould in tropical climates if the store boxes are kept in large tin boxes with well-fitting lids and the gel kept in bags or trays on and below the store boxes. This chemical turns from blue to pink when it has absorbed its full quota of water vapour. It may be revitalised by heating to a high temperature. Its chief advantage is that it is in no way deliquescent. The use of creosote on small pinches of cotton wool on pins inside the store boxes in combination with the silica gel will completely prevent mould, provided they are regularly examined and renewed.

Finally, do not keep insect cabinets with their backs to an outside wall of the house. They should be placed with their backs to an inside wall and away from a window. There should be plenty of air space round the cabinet, which should not be stood in a draught. These precautions will help to prevent drooping and other troubles. A touch of liquid cellulose between the upper fore and hindwings right at the base will cure the type of drooping where the hindwing droops and the forewing does not or does so at a lesser angle. If the hindwing is carefully pressed up against the forewing and held there until the cellulose has set, the hindwing droop will be cured. Drooping can be particularly troublesome near the sea coast and can only really be prevented there by the use of chemical dryers and keeping the room-temperature as constant as possible and not too high. Needless to say, the more air-tight the store boxes and drawer frames are, the better.

R. E. PARSONS (1512).

ASSEMBLING IN THE HYMENOPTERA?

When searching for larvae on some poplars near Salisbury, I noticed what seemed to be a number of flies circling around the lower leaves of a tree. On looking more closely I found that they were small ichneumons (species not yet determined).

I noticed one sitting on a leaf and captured it in my fingers. It turned out that this was a female. I then saw that a number of the ichneumons were settling on the same leaf and running over it with vibrating antennae, evidently attracted to the leaf and looking for something. I thought at the time that these must be males 'assembling' to my female, in the same way as male moths are attracted. This possibility has been suggested by Step with reference to *Perispudus* and *Lissonota*. The insects continued to visit the leaf for quite a time after I had removed the female. After several unsuccessful attempts, I managed to capture another specimen, bottled it, and paid no further attention to the insects.

On examination, however, it turned out that this second specimen was also a female, which suggests that perhaps my original idea was wrong, and that the flying ichneumons were not males at all, but more females. In this case, a possible explanation of their behaviour is that they were searching for hosts to lay their eggs in. It is possible that there had been a host larva on the leaf in question, to which the odour still clung, and that the females were led to it by their sense of smell.

Which of these two explanations is correct? Here is a field for some ingenious experimentation and I hope we may hear more from other members.

H. G. MORGAN (90).

1951: THE LATE SEASON

It will be interesting to see if the extraordinary lateness of this season has any lasting effect on our insects. For instance, those species which are normally double-brooded will have to speed up their life-cycle considerably if they are not going to be overtaken by the autumn before they have reached their normal stage for hibernation. When I visited the South, to my astonishment I found the North Downs at the end of May in a condition which would have suggested very early May or even late April. In fact the lateness of the season was even more noticeable in the South than in my home neighbourhood of Cumberland and Westmorland—though it was certainly late here as well. Observations will perhaps help to give us additional information on the influence of the weather on our flora and fauna, for it may be many years—we may hope it will be—before another season comes round which is as late as this year's.

As a comparison it may be interesting to note the species of butterflies seen on the same stretch of downland in Surrey in three different years: —

	1948 April 24	1949 May 14	1951 May 30
P. egeria (Speckled Wood)	*	*	*
A. urticae (Small Tortoise-shell)	*	—	—
V. atalanta (Red Admiral)	*	—	—
N. io (Peacock)	*	*	—
P. c-album (Comma)	*	—	*
P. megaera (Wall)	—	*	—
C. pamphilus (Small Heath)	—	*	*
L. phaeas (Small Copper)	*	*	*
C. rubi (Green Hairstreak)	*	*	*
P. brassicae (Large White)	*	*	*
P. rapae (Small White)	*	*	*
P. napi (Green-veined White)	*	*	*
G. rhamni (Brimstone)	*	*	*
E. cardamines (Orange-tip)	*	*	*
H. malvae (Grizzled Skipper)	*	*	*
E. tages (Dingy Skipper)	*	*	*
A. euphrosyne (Pearl-bordered Fritillary)	—	—	*
H. lucina (D. of B. Fritillary)	—	*	—
C. argiolus (Holly Blue)	—	—	*
P. icarus (Common Blue)	—	*	—
A. agestis (Brown Argus)	—	*	—

The days were all brilliantly fine and any species present would have been on the wing. It was extraordinary that on May 30th this year there was no sign of *P. megaera*, *H. lucina*, *A. agestis* or *P. icarus*. Presumably, they simply had not begun to emerge. In fact, there was little more to be seen that day than on April 24th in 1948. We must all keep an eye open for possible effects of the tardy season.

J. H. Vine Hall (1520).

•

The first three months of this year (1951) were the wettest on record in many places, and most certainly in the South-east, yet these conditions had little effect on the emergence of some of the early species of moths, as the following record will show. The dates quoted are first appearances, and in each case males taken at light. I should like to compare these local occurrences with observers in other areas.

February 1. Spring Usher (*E. leucophaearia*) and Pale Brindled Beauty (*P. pedaria*).
February 12. Dotted Border (*E. marginaria*).
March 2. Oak Beauty (*B. strataria*).
March 13. March moth (*A. aescularia*).

The first Brimstone butterfly (*G. rhamni*) on the wing after hibernation was personally observed on March 15th, a solitary male flying by the wayside, although " yellow butterflies " were reported on March 1 by workmen felling trees in local woods, obviously *rhamni*. These two dates in March represent the only Spring-like days in an excessively wet quarter

In recent years the Brimstone, the " visiting-card of Spring," as I like to consider it, has first appeared three times on March 14: in 1941, 1943, and 1945; and my earliest record of this species is on February 17, 1946. In my experience this species is not attracted from its quarters during warm days in winter nearly as frequently as the Small Tortoise-shell (*A. urticae*) and Peacock (*N. io*). In this area (Eastleigh, Hants.) the Comma butterfly (*P. c-album*) occasionally takes to the wing in winter sunshine.

Paul H Holloway (429).

LETTERS TO THE EDITOR

Dear Sir,—It is gratifying to note, both in the *Bulletin* and through other channels, that some serious attention is being given to the question of the protection and preservation of our rarer insects.

This is ever more necessary having regard to the conditions being created by our modern 'civilisation.' One rather less obvious point in this connection, which may well in due course affect even some of our more common insects, is that the Forestry Commission is planting approximately 90% of Firs, Larches, etc., to 10% of broadleaved species (mainly beech and oak).—Yours faithfully,

George C. Holroyd (253).

Dear Sir,—I was very interested in an excellent article in the *Bulletin* No. 126 by H. E. Hammond, entitled "The Protection and Preservation of Rare Insects." I should like to re-emphasise some of the dangers of releasing insects, which he pointed out.

If a small collection of a rare species is made and a large stock reared from it, the proportions of inherited factors (genes) in the wild population and the bred animals will be very different. Consequently, if these insects are then released in the original locality, in large numbers, the proportions of the genes in the wild population will also be materially altered. Now it is known that a very delicate balance in the ratio of the inherited factors is found in wild populations and that this balance is the result of natural selection, which ensures that the breeding community is well adapted to the environment. Therefore, any alteration in this balance may temporarily upset the colony and reduce fertility. This will cause a reduction and not an increase in the size of the population.

There are a number of people in this country who are investigating the factors which control population size and evolution in small colonies. The release of large numbers of animals may completely spoil work being carried out along these lines. For example, a certain colony of a moth, near Oxford, has been under intensive investigation for 11 years. If a large number of moths was suddenly released in it, all the careful work carried out over this long period would be completely ruined at one stroke.

It is far safer to start a new colony of a rare insect than to try and increase the numbers in an established colony, by breeding up a big population from a few wild individuals. Even this is dangerous as it will upset the records of people studying the distribution of animals. However, if an insect is very rare it is well worth starting a new colony if its exact location is made known. To avoid collectors destroying a new population, the record should be sent to a number of organisations interested in animal distribution. The information can then be kept secret from the general public, but made accessible to people who are genuinely engaged in research.

Although it is very desirable to protect rare species, it is best to do this by preserving the habitats and by restricting collecting. However, when this is impossible a new colony should be started, but only after careful consultation with experts (as Mr. Hammond pointed out) and then only if exact records are made available to scientific organisations interested in the species.—Yours faithfully,

P. M. Sheppard (291).

Dear Sir,—The distribution map for *Dytiscus marginalis* L. published in *Bulletin No. 125* surprised me, as I have always thought that the species was reasonably common in this county. Its presence in vice-counties 35, 36, 37, 38, 23, 22, 7 and 6, i.e. every vice-county surrounding 33 and 34, which together make up the county of Gloucestershire, lend force and reason to that thought.

Gloucestershire entomologists should not be content with that question mark on the map and I have already circulated most of the Grammar schools in the county with a request for information. If any Gloucestershire member has any records, or any other member has Gloucestershire records, would he let me have details, so that I can let Professor Balfour-Browne have as complete a report as possible on the beetle's occurrence in the two vice-counties?

Though it is not an entomological matter, I would like to ask members for similar details concerning the occurrence of *Clematis Vitalba* L. (among its local names are Wild Clematis, Traveller's Joy, Old Man's Beard, Fuzzy Wuzzy, and Half Wood) in the same area. I am gathering information for Mr. E. Milne-Redhead of Kew.—Yours faithfully,

R. S. George (1402).

Dear Sir,—By observing the relative numbers of "enemy" species of insects in any year, would it be possible to forecast the status of the host insects in the next year?

For instance, this seems to be (in this area—Maidstone) a good year for *Ichneumonoidea*. It should be interesting to observe the numbers of *P. brassicae*, *P. napi*, *P. rapae* and other much-parasitized butterflies next year.—Yours faithfully,

R. USHER (1768*).

[Our member overlooks both the effects of annual immigration and the difficulties of obtaining any scientific assessments of relative numbers, but his letter may, I hope, evoke a note from one of our parasitologists.—ED.]

A GARDENER'S OBSERVATIONS

Because I am by trade a gardener, I naturally take an interest in insects. Perhaps other members do not realise what a good place for finding winter larvae is an area of crazy paving, especially if it is overgrown with weeds. Between October 1950 and February 1951 I found in the Carshalton neighbourhood larvae of the following moths:—Clouded Brindle (*Xylophasia hepatica*), Clouded-bordered Brindle (*X. rurea*), Heart and Dart (*Agrotis exclamationis*), Turnip (*A. segetum*), Dotted Clay (*Noctua baja*), Angle Shades (*Phlogophora meticulosa*), Nutmeg (*Mamestra trifolii*), Square-spot Rustic (*Noctua xanthographa*), Large Yellow Underwing (*Triphaena pronuba*).

There is a crack about three-eighths of an inch wide between the frame of my back door and the cement wall of the house (the result of bomb blast). It is open to the full heat of the sun. In this crack a Black Wasp (*Psen pallipes*) has made its cells. I watched it make an average of ten journeys every half-hour from plants to crack, a distance of twelve yards, carrying Aphids. Also in the crack, there are cells of a Blue Osmia (*Osmia coerulescens*) which is busy in and out every ten minutes or so. The wasp and bee often arrive together: when this happens, the bee always goes in first, the wasp seeming to be nervous.

In August, while walking on Banstead Downs, I noticed the old stump of a Gorse bush which had been badly holed by some sort of beetle grub. I broke it off out of curiosity.

In the bottom of the stump, at earth level, was a large nest of Red Ants (*Myrmica rubra*). There was also a Solitary Bee (*Osmia rufa*) which had completed one cell and started on a second. The first cell was filled with a sort of mixture of honey and pollen. The bee was at work in the second cell. Although there was a passage or boring running from the ants' nest right past the cells to the top of the stump, the ants did not show the least interest in the bee and her work.

W. G. C. BOOKER (1742).

"STAGGERED" EMERGENCE OF PRIVET HAWKS

In my notes on "'Second-Year' Privet Hawks" (*Bulletin* No. 106, p. 77), dealing with pupae resulting from five larvae hatched in 1946, I cited the emergence of one imago ("forced") in April 1947, a second in June 1948. The fifth, at the time the notes were written, had not emerged. So far as is known, it succumbed early in 1949.

Summing up: of the five pupae involved, two emerged during the first year following pupation and two during the second, while the remaining pupa did its best to overwinter a further year. One can only suggest that research into the causes of "staggered" emergence of this nature, occurring in quite small groups of individuals (all of which—with the exception of one subjected to "forcing"—were kept in more or less identical conditions) offers most interesting possibilities and plenty of scope.

One theory—which, though merely tentative surmise, would seem to commend itself to consideration—is that "staggered" emergence results in a "reservoir" of imagines, of both sexes, in years when a relative scarcity might otherwise come about. But an obvious *caveat* is that *S. ligustri* pupates underground, deep enough very largely to escape the influence of those short-term phenological factors that sometimes tend to bring about a high mortality rate in pupae of other kinds. It must also be remembered that buried pupae are not without their enemies, animal and otherwise. Just what part is played, and to what extent, by genetical factors? It would be interesting to hear whether fellow-members have any theories.

PETER MICHAEL (748).

INSECT ORDERS

Order IX

(Continued from Vol. 9, page 89)

PSOCOPTERA (*Booklice*)

Small insects, with or without wings, possessing biting mouthparts, marked pterostigma on wings (when present): ovipositor lacking. Solitary or gregarious. A small order with 70 to 80 British species, all of which belong to the sub-order Psocida.

The Order is divided into two sub-orders.

I. Zoraptera.—Antennae 9 jointed. Possessing cerci. Very minute insects, 3mm. or less long. They live under bark, in decaying vegetation, etc. Some species live gregariously. Confined to tropical America.

II. Psocida.—Antennae long and filiform, possessing up to 50 segments. Cerci absent. Some species (such as the common booklouse, *Liposcelis divinatorius*) are wingless. Psocids are usually gregarious and are found in many widely separated habitats. Under bark, old palings, haystacks, old books, and under wallpaper are common habitats. They have occasionally been known to attack museum specimens and sometimes occur in flour mills. Due to their very small size they are very easily overlooked.

The sub-order Psocida is divided into two superfamilies.

i. *Trimera*, with 3-jointed tarsi and containing 7 families including the wingless Liposcelidae.

ii. *Dimera*, with 2-jointed tarsi, includes 3 families including the Psocidae. The exact classification of the Psocoptera is very obscure and there has been no book on the British species since 1887 when they were monographed by McLachlan, through Pearman has published papers on certain species more recently. Hints on collecting are given by Dr. E. Broadhead in *AES Leaflet, No. 21*.

(To be continued)

Brian O. C. Gardiner (225).

THE SMALL BLUE

Mr. R. A. L. Dibb (1688) would be glad of information about any occurrence of the Small Blue (*Cupido minimus*) in Yorkshire, where he has vainly searched for it.

THE SILVER CLOUD MOTH

The larva of *Xylomyges conspicillaris* Linn. feeds both by day and night in captivity, but seems perhaps to feed most in the evening, and when full grown often buries itself in the earth at the bottom of the cage by day and comes up to feed towards evening. The larva is also fond of resting at the top of the breeding cage, but does this more often when not fully grown. When full grown, at any rate, the larva can be persuaded to eat sloe or blackthorn, which could, of course, easily be reached from the ground in the wild state.

A curious habit, noticeable when the moth emerges from the pupa, is the tendency for the wings not to begin to expand for a considerable period. One particular moth was seen by me to emerge at approximately 10.30 a.m., and by 1.30 p.m. its wings had still not begun to expand; but when I looked again at 1.45 p.m. the wings had fully expanded and were held in the normal drying position. This tendency may occur in other moths, and I, for one, should like to see the facts recorded in the *Bulletin*.

C. S. H. Blathwayt (651).

BRITISH BUTTERFLIES

I am collecting information about butterflies in Britain, which includes migrants and casuals. This means searching all available records of as early a date as possible. Transactions of Nat. Hist. Societies, County Lists are most useful. I have Entomologist's Annual complete 1855-1874, George Samouelle 1824, J. F. Stephens 1828, and John Curtis 1824-1839, as well as Stainton 1857 and Newman 1869.

I should be most grateful for the loan for a few weeks of anything which would be of use, pre 1850. I would pay postage, of course.

H. B. Sargent (1189).
Rose Cottage,
Breage, Helston, Cornwall.

ARTICLES

Have *you* yet written something for the *Bulletin*? The Editor needs many more contributions to choose from, if the standard of interest is to be maintained. Be sure of your facts; he will furbish up what you say, if need be.

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AES
ANNUAL EXHIBITION
1951

SATURDAY, 22nd September, from 2 p.m. to 6 p.m. at **BUCKINGHAM GATE CENTRAL SCHOOLS,** Wilfred Street, London, S.W.1.

ADMISSION FREE.

EXHIBITS. The Hall will be open from 10 a.m. for receipt of Members' exhibits. Bring along your specimens (any Order, living or set), equipment, apparatus, photographs, drawings, etc. If you require a large space, notify Meetings Secretary in advance. Please label clearly.

TALKS. Major Maxwell Knight, "Entomology in relation to other branches of Natural History." Miss Cynthia Longfield, "Dragonflies." Mr E. E. Syms, "Entomology and the Camera."

DEMONSTRATIONS. Members will demonstrate setting, etc.

GROUPS. Members of Groups who have been corresponding will be able to meet for discussion.

SURPLUS TABLE. If you have spare ova, larvae, imagines, equipment, books, etc., for sale or exchange, bring them along labelled with name, price or exchange wants. No charge for use of this table.

ENTOMOLOGICAL TRADERS will be in attendance.

Offers of help and enquiries to Hon. Meetings Secretary (K. H. Bobe), 19 Hengist Road, London, S.E.12.

BRING YOUR FRIENDS AND AN EXHIBIT!

HOW TO GET THERE—

VOL. 10
No. 130

BER - - 1951

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES NOTICE
WHERE TO WRITE

Applications for new membership; offers to help with AES work; Exchange Notices to: E. LEWIS, *8 Parry Road, London, S.E.25. (Wants and Exchanges Lists are circulated in March, May, July and October and notices must be received by the 15th of the previous month.)*

Advertisers to: L. W. SIGGS, *10 Repton Road, Orpington, Kent.*

Non-arrival of Bulletins *and changes of address should be reported to*: B. L. J. BYERLEY, *48 Elmgrove Road, Harrow, Middlesex.*

Offers to lead Field Meetings, exhibit etc., to: K. H. BOBE, *19 Hengist Road, London, S.E.12.*

Manuscripts, drawings and books for review to: W. J. B. CROTCH, *5 Stanley Crescent London, W.11.*

Subscriptions (10/- per annum, 5/- for Juniors) to: P. C. LE MASURIER, *85 Warren Drive, Tolworth, Surrey.*

AES BULLETIN

No. 130

OCTOBER 1951

DO YOU RECORD YOUR OBSERVATIONS?

The recording of facts is to some a fetish and to others a bore. While here I am concerned with the rearing and breeding of exotic moths, the same principle is equally applicable to all branches of nature study and especially in the field of experiment. If only from a personal point of view, some record should be kept, so that, if you rear a species more than once, you can refer back and be sure of repeating successful methods and avoiding previous mistakes. In a less personal way, by making your observations available to others you give your fellow enthusiasts the benefit of your experience and in return may hope to derive information from the records they have made.

May I suggest for those who have little time to spare for making copious notes a simple and brief record of the following type:—

1. Species, date, origin and number of ova received.
2. Date and number of hatchings.
3. Brief description of the larvae when hatched and name of food-plants offered, accepted and rejected.
4. Date of each moult and a short description of larvae at each instar.
5. Date of pupation.
6. Dates of the emergences of moths.
7. If a pairing was obtained, was it in a large or small cage, enclosed or airy, and under what weather conditions. How long were pair together? How many eggs were laid during what period? Were they fertile?
8. A general note of the conditions under which rearing took place with particular reference to weather which was not normal for the time of the year.

Simple as the above is, it will provide much useful information for yourself and others. If one is interested enough in silk moths to try and rear them, then surely the keeping of so easy a record should not be too much trouble.

The enthusiast who has already learnt the value of making notes can, and usually does, record more elaborately. For example, not only will he record the date and number of eggs received, but he will, especially with a new species, measure and describe size and shape, colouring and marking of the egg. He will note too the formation in which the ova have been laid, the conditions under which they are being incubated, and make a daily inspection in order to note any change of appearance that may occur as the time for the larvae to emerge draws nearer. When the larva hatches, he will note its description and reactions, whether it eats its egg shell or not, shuns or seeks the light, eats by day or night only. He may in some cases see a change in colour take place within the first hour. If he is interested in the rate of growth, then measurement of length is made periodically, and the man who is fortunate enough to possess chemical balances will in all probability weigh as well as measure. Throughout every stage he will observe and note every item of habit and description that he can. Particular attention will be paid to atmospheric conditions daily.

All these and many more items that are recorded are facts which then form the basis of conclusions and theories, but in using them for this purpose care must always be taken to distinguish between fact and deduction. A good set of notes will include confirmation of known data. Accurate details leading up to losses are important in order to determine where a mistake has been made and to avoid a similar one another time.

No one individual will be able to provide all the answers, so the more reports that are received the more complete the knowledge available concerning a species. A duplication of an observation is always verification and is not therefore waste of time. As one of the aims of the Silk Moth Group is to collect and collate as much information as possible about rearing and breeding exotic *Saturniidae* in this country, it is hoped that all who rear them, whether or no they join the group, will endeavour to send in at least some small item of information.

Although the *Silk Moth Rearers' Handbook* has proved an invaluable help to so many, few can fail to realise how much more information might be included were it available. It is only by the co-operation and team work of the interested members of the AES that this deficiency can be rectified and the second edition justify the allocation to it of further Publications funds. I have accepted Mr. Crotch's invitation to act as honorary secretary of the Group and it will help him if observations are first sent to me for comparison and collation.

W. R. Smith (1641).

A BOON FOR FIELDWORK

I have been using an insect "collecting appurtenance" for some considerable time, which I think may be of interest to some other members.

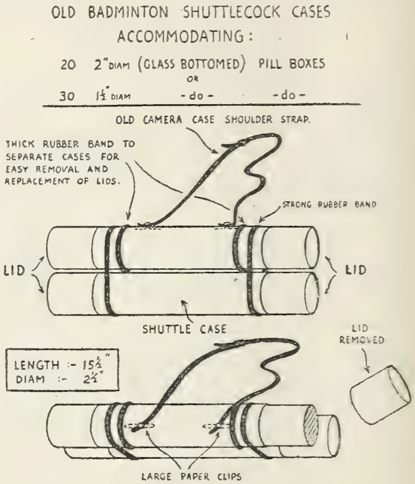
Disliking intensely the burden of a haversack on my back in hot weather, I decided to find an alternative means of carrying my collecting boxes. The alternative had to be light in weight, durable, and comparatively small. It is made in the form of two (or more) old Badminton Shuttlecock Cases, secured together and carried by means of a thin strap across the shoulder. I use two cases fastened together with two *strong* rubber bands (a third and fourth case could be added, but this increases the weight and becomes rather bulky). In order to facilitate the removal of the lids a *thick* rubber band is placed around one case at either end—this has the effect of slightly separating the cases. Twenty collecting boxes of 2″ to 2¼″ diameter can be carried in this container, and smaller boxes can be nested for transfer to a pocket when in use.

In addition to the shoulder strap, I also employ a small strap which is fastened directly to my belt. This prevents the container from bumping about when I am running. The shoulder strap is secured to the top case by means of a large brass paper clip at either end. As the cases consist of an inner and outer "skin", it is a simple matter to fasten the clips securely in the outer "skin" by withdrawing the "inner skin" and replacing after the clips have been fitted, with the addition of a little liquid glue, as a security measure.

When in use, an empty pill box is carried, ready for "action", in the pocket. This, when used, is placed in the front end of the container, and the empty box replaced by another from the other end.

The apparatus is figured below.

R. A. L. Dibb (1688).



WEIGHING WING-PATTERNS

While planning some future experiments, it became necessary to devise a method for measuring certain irregular areas on butterfly wings, so that these measurements could be used for assessing differences between populations, etc. Probably the simplest method would have been to place a piece of tracing cloth over the wing, trace the outline of the area to be measured, then calculate the surface area with a planimeter. However, a planimeter of sufficient accuracy was not available, so an alternative technique was devised which gave the desired result.

For a trial, the red band on the forewing of the Red Admiral was chosen. This was traced on to a piece of tracing cloth; then the exact outline was transferred to Clifton board (similar to Bristol board, but rather thinner and much cheaper) by placing the Clifton board over the tracing cloth, illuminating from below, and drawing round the outline seen through the piece of board. This area of board was then carefully cut out by means of a sharp scalpel. The result was a small piece of card of exactly the same area as the band on the Red Admiral's wing. This was then weighed on an analytical balance to the nearest 0.0001 gramme.

A number of these pieces were cut from the same tracing and weighed, and the error between them was found to be within suitable limits for the experiment. A rough quantitative test was then made so as to assess the approximate error to be expected from such a test.

This time two rectangles were drawn on a piece of thin paper, one measuring 10mm. × 10mm. and the other 10mm. × 9mm. — that is to say the second rectangle had an area 10 per cent. smaller than the first. These rectangles were then traced round and cut out as before, only each one was repeated ten times. The weights are shown in the following table:—

10mm. × 10mm. square.	10mm. × 9mm. square.
0.0255 gms.	0.0227 gms.
0.0257 ,,	0.0219 ,,
0.0248 ,,	0.0227 ,,
0.0253 ,,	0.0236 ,,
0.0255 ,,	0.0222 ,,
0.0255 ,,	0.0226 ,,
0.0259 ,,	0.0236 ,,
0.0242 ,,	0.0234 ,,
0.0258 ,,	0.0230 ,,
0.0256 ,,	0.0222 ,,
Mean 0.0253 (8) gms.	Mean 0.0227 (9) gms.

It will be seen that there is a considerable disparity between weights in the same group, but with practice this could no doubt be reduced. The averages, however, of the two groups are very significantly different. In fact one is almost exactly 10 per cent. smaller than the other.

It seems, then, that this method is delicate, if somewhat laborious, and it may prove useful in genetical and ecological work, particularly in the field, where tracings could be made from lightly anaesthetised insects which could afterwards be marked and released.

P. L. Bradley (1360).

LEPIDOPTERA IN MUNSTER

I spent the first fortnight of May on holiday in West Cork. Salmon fishing had priority over bug-hunting, and in any case it was too early in the season for the exciting things — e.g., White Prominent (*Leucodonta bicoloria*) which is said to exist still on the borders of Co. Kerry. The Orange-tip (*Anthocharis cardamines*) was well out, and I took a series of the females with yellow-suffused hindwings which, according to Ford, represent a subspecies in the making. Dark females of the Green-veined (*Pieris napi*) were abundant, and other butterflies seen were Small White (*P. rapae*), Speckled Wood (*Pararge egeria*), Wall (P. *megaera*), Holly Blue (*Celastrina argiolus*), Green Hairstreak (*Callophrys rubi*), Small Copper (*Chrysophanus phlaeas*), and hibernated Peacock (*Vanessa io*). The latter was very common; in contrast, I am told, the Small Tortoiseshell (*V. urticae*) is at all times extremely scarce.

The only moths I encountered were the Emperor (*Saturnia pavonia*), dashing about on all heathery hillsides and seen as high as 1200 feet; Common Heath (*Ematurga atomaria*), abundant on the mountains; and Common Wave (*Cabera exanthemata*). In general, I was struck by the sparsity of Lepidoptera, both in species and numbers; the density of even the commonest sorts was markedly less than one would expect in England in the worst season.

Local races worth looking for are those of the Wood White (*Leptosia sinapis*), Meadow Brown (*Epinephele jurtina* ssp. *iernes*), Marsh Fritillary (*Melitaea aurinia*) and Common Blue (*Polyommatus icarus*) — which resembles the Scottish form. I was too early for any of these. I was told that the Silver-washed Fritillary (*Dryas paphia*) is plentiful, though var. *Valesina* is absent, and that the Large Heath (*Coenonympha tullia*) is much commoner than the Small Heath (*C. pamphilus*). I was shown a series of the Grayling (*Hipparchia semele*) which looked much brighter than our English ones, though, of course, I had none with me for comparison.

Flowering plants are as scarce on the hills as butterflies, but it was a joy to see for the first time the large-flowered Irish butterwort (*Pinguicula grandiflora*), common in all boggy places, and the Kerry spurge (*Euphorbia hiberna*) growing in the shade of the rhododendrons which make little forests of all the valleys by the sea.

John Moore (146).

IDENTIFICATION OF LADYBIRD BEETLES

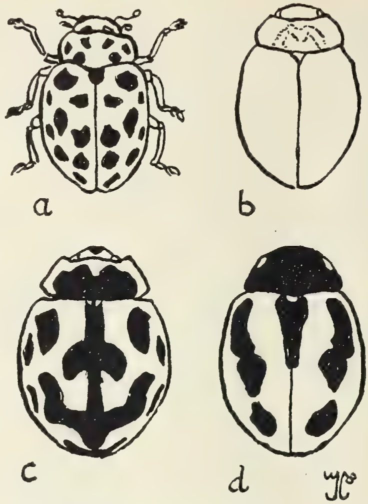
How many spots has a Ladybird? One in eight of AES members, being coleopterists, will know the answer. Others may recollect those they have seen, and are likely to think " two " or " seven." In fact, some Ladybird beetles have none and the highest number is twenty-four. The numbers of spots have generally determined their specific names, e.g., *bipunctata* (2-spot), *septempunctata* (7-spot). To avoid writing the long Latin names of the numerals, it is customary to use the Arabic numeral, e.g., 18-*punctata* instead of *octodecimpunctata*.

The following notes on the species most likely to be observed should prove useful to the beginner, who finds difficulty in obtaining printed works containing sufficient information at reasonable cost. They may also obviate the necessity in some cases, of postal identification.

The three most abundant, *Coccinella bipunctata*, *C. 7-punctata* and *C. 10-punctata*, are known to every entomologist by their red wing cases or elytra with black spots: but there are two common vars. of *bipunctata* on which the spots spread and join to give black wing cases only blotched with red. The var. *quadrimaculata* has two red blotches left on each wing case (elytron) and var. *sexpustulata* three. The legs and underside are however always black and without hairs.

When *C. 7-punctata* first reaches the adult stadium the wing cases are of a dull ochreous shade, not attaining the characteristic red until about a month after emergence in summer, or about two months before hibernation. The central spot nearest to the scutellum laps over on to each elytron, but is counted as one, hence 7 (cf. (*a*) of the figure: 9+9+1=19).

C. 10-punctata is our most variable species, normally red with black spots, but almost 50% of personally observed specimens have been black with square-shaped blotches of red, cream, or any intermediate shade. The readiest identification of this species is by the yellow colour of the legs, but it must be remembered that other species have yellow legs, with different numbers of spots. Although their habitat is fairly general they seem to favour oaks, for while beating lower branches for larvae of *Thecla quercus* (the Purple



(*a*) Anisosticta 19-punctata.
(*b*) Aphidecta obliterata.
(*c*) Coccinella 14-punctata.
(*d*) Coccinella hieroglyphica.
All diagrammatic and enlarged.

Hairstreak Butterfly) in May, some dozens of all forms have frequently fallen into the tray.

Least variable of all is *C. 14-punctata*, which is of a light yellow colour, but the spots run together in a sort of anchor design (figured at (*c*)). *C. hieroglyphica*, found on heather, varies between entirely yellow and entirely black, but any markings present run into lines (figured at (*d*)). It is less rounded than the others mentioned. A very small and common Ladybird found at roots of grass is *Symnus frontalis*, black, with a red spot on each wing case: it has a hairy underside. *Coccidula rufa* is rather pointed, wholly reddish, and confined to marshy places, where it is common. In similar situations you may find *Micraspis 16-punctata*, yellowish, with fused black spots and *Anisosticta 19-punctata*, yellow, but with separated spots (see (*a*)).

The largest British species, the " Eyed " Ladybird, *Anatis ocellata*, is red with yellow-ringed black spots, and is found on various species of Coniferous trees. A smaller and more common species, *Aphidecta obliterata*, varies between pale yellow-ochre and black, but always has an M-shaped mark on the thorax (see (*b*)). *Hippodamia 13-punctata*, although rare,

may appear unexpectedly and be mistaken for a commoner. It has black spots on a yellow or orange ground.

Finally, I should like to mention *Subcoccinella 24-punctata*, which is rust-coloured with black spots and differs from other Ladybirds in being the only British representative of the Sub-family *Ephilachninae*. It is quite distinct in habit as well as structure, for it is a leaf-eater. All those previously named are predaceous on other insects, usually Aphids.

PAUL H. HOLLOWAY (429).

OBSERVATIONS AND QUERIES

Mr. ERIC PARKER (865) reports the finding at 11 p.m. on July 29th of a Pine Hawkmoth (*S. pinastri*) on its back and almost inert in a lamp shade by an open window. Have there been any recent records of this moth in Surrey?

Mr. REGINALD GULLY (1797) had brought to him at work on July 27th an Eyed Hawkmoth (*S. ocellata*) under conditions which ought to have precluded its survival. It was crowded into a matchbox, squeezed against its own pupa case and sodden with moisture, its wings unexpanded: and it had been there for four hours. Even then there was no convenient place to put it and it had to go into a toolbox where foothold was difficult. Nevertheless its wings had expanded perfectly by 6 p.m. and they had dried out a delicate shade of pink touched with lilac. There is very little fawn except on the outer tip of the forewings: while the underwing has a perfect eye-spot, the normal deeper pink stretches from the region nearest the body almost to the outer edge. It was a male with a very large body, as large as a good sized Poplar Hawk female, and the antennae were "enormous". The pupa had been dug up on 26th June. [It seems likely that this is a pronounced variation *rosea* Bartel.—ED.]

ALAN KINDRED (1707*) reports rearing nearly fifty Vapourers (*Orgyia antiqua*) this year from two cocoons collected in January. Five females emerged first and then for about a fortnight nothing but males. The odd thing was that not a single male paired, not even with a newly emerged female. Anyone who has seen the frenzied assembling of male Vapourers will find this astonishing: has any member any light to throw upon the situation?

In spite of the fact that South states that the female Wood Leopard Moth (*Zeugera pyrina*) visits light, among more than sixty specimens taken in a light-trap there were no females. Is this also unusual?

LETTERS TO THE EDITOR

Dear Sir,—From time to time during the life of our Society, much has been made of the assistance which might be derived by scientific men from the concerted activities of amateurs. So far, so good. It must be remembered, however, that before any good scientific work can be done, or any theories put forward, the scientific attitude of mind and approach must be cultivated.

As a Society, we exist "for the encouragement and assistance of beginners, and especially young people" (or words to that effect). We are surely not setting the young especially, or beginners in general, a good example by publishing in the *Bulletin* articles which could hardly be said to show the scientific approach. In fact, several of the articles published recently have contained, or been based on unqualified, dogmatic statements. These are such as are quite common in colloquial conversation, but as scientific statements they are valueless, either because they are false (owing to misuse of words or sentence construction); or because they misrepresent conjecture or belief (i.e., *personal* opinion) as proven facts (i.e., descriptions of phenomena which *anyone*, given the requisite faculties and facilities, can go and observe for himself and describe similarly).

A case in point is supplied by much of the discussion concerning mimicry in butterflies, which appeared recently. On the other hand, several of the articles (*Bulletin No. 125*) were exemplary in their caution and scepticism.

It would seem, then, that what is wanted is an article, or a short series of articles, by a scientifically trained man, describing the scientific approach, method of performing experiments, recording and analysing results, and drawing legitimate conclusions.

I should welcome letters, either direct to me or through the *Bulletin*, commenting on my remarks.—Yours faithfully,

PETER G. TAYLOR (719).

The acting editor has invited me to comment on Mr. Taylor's letter, which I hesitate to do: but, arising out of it, and because I regard the use of commonsense and of caution in drawing conclusions as *the* essentials of the "scientific approach" in biology, I can, perhaps, offer some help to young workers by giving a few examples of events in my experience.

When we remember that a large part of biological research has been based upon the work of amateurs, either the amateurs must have possessed commonsense or those who have benefited by their work have been able to re-interpret the conclusions given and have separated the grain from the chaff. Even if the 'untrained' have tended to be dogmatic in their statements, dogmatism is not confined to amateurs; and any subject that becomes controversial is almost certain to produce dogmatic statements from some of the contributors. The great Emerson wrote "Difference from me is the measure of absurdity," and we all have a leaning towards that view. But, apart from mere dogmatism, it is well known that an event happening in the sight of a number of witnesses is reported in various ways, even when witnesses are trained observers, merely because different part of the event make different impressions on the observers and the story each tells depends upon the difference in the balance of the parts.

In carrying out a piece of research, there is a danger of this difference in balance in the sequence of events leading to misinterpretation and possibly the amateur may suffer in this way more than the trained biologist: but we are all apt to accept the first solution of a problem that comes to us, so long as it does not seem impossible, and even, in some cases, when it does. Here is an extract from a newspaper cutting which I was sent some time after it appeared more than twenty years ago. I have treasured it ever since. "One morning, conspicuous on the white paint of our conservatory, was a bee on what appeared to be a flat circular brown leaf about the size of a threepenny piece. On closer examination I observed that the bee had only one wing. I was just hurrying off for witnesses when the bee and brown disc glided skyward. Can you elucidate what has been a puzzle to me?". The newspaper provided the following explanation:—"The maimed bee intending to get home *somehow*, was employing a section of a leaf, either for steering purposes or like the wing of an aeroplane. Perhaps, gripped by the insect's legs, the leaf was controlled and warped in much the same way as the first machines of the Brothers Wright were warped for steering purposes in the earliest days of flying. Has anyone a better theory?". I do not know whether anyone replied, but there are some interesting points here. In the first place why was the observer anxious to obtain witnesses? Secondly, seeing that the insect did fly away (and I don't think I am being dogmatic in stating that it really did so) the observer was wrong in stating that it had lost a wing. Secondly, the gentleman who explained the phenomenon obviously knew nothing about the Leaf-cutter Bee and without any knowledge on that subject and without having seen the incident, dogmatised on it and challenged the world.

Many years ago when I was preparing some children's lectures on insects, I extracted (or rather pushed out) some large Caddis larvae from their cases made of pieces of leaf, stick, etc., and I placed the larvae in an aquarium, the bottom of which was covered with variously coloured beads, from which each larva proceeded to make itself another case. I was surprised to find that, although the cases were made of beads red, blue, green, etc., very few white beads were used. Fortunately I was cautious in jumping to a conclusion as to why this had happened and, after trying a few explanations, I weighed the beads and found that the white ones were rather heavier than the others. That is as far as I carried the observations at that time and I have never got back to it, so I bequeath it to any one sufficiently interested to go into the matter. I should have counted the beads of different colours on each of the cases to find out if one colour predominated and, if that was so, all the used beads should have been weighed and I might have found that each larva had a favourite colour. If I had been an enthusiast like the one who explained the flight of the "maimed" bee, I should have launched out at once on the colour-sense of Caddis larvae!

When I was working on the habits of the Small Eggar Moth (*Eriogaster lanestris*) one evening I brought home in Cambridge a number of well-grown caterpillars from a large web on Sloe and placed them at the end of a thin

horizontal branch of an espalier plum tree. This branch had few leaves and, near its end, there was a small branch going off at right angles. The caterpillars at once set about spinning a web and eating the leaves and the branch was weighed down by the weight of the family. By the morning, they had all moved towards the main trunk of the tree. Here was a chance to write up the intelligence of these larvae. They had realised that the branch was not strong enough to support the increasing weight of the family and web and so had moved to a safer place! But was this the explanation? The newspaper authority might have accepted it. However, supports are necessary in order to make a three-dimensional web of the usual type, and the larvae had bitten off the leaves and the small branch at the apex: so they moved along the branch to find a suitable building site. That sounds a satisfactory explanation but, again, is it? It seems more likely that, having eaten all the available food, the caterpillars moved in the only direction possible in the hope of finding food supplies—and were fortunate in also finding an excellent site for the new web.

One other matter before I close. In my early days at entomology I had worked out the habits and life history of a certain bee and had discovered something that seemed to me peculiar. I mentioned this to an admitted expert on the Hymenoptera and he flatly contradicted me. In the following year, working with another bee, I came across the same fact and when I reported it to the same expert, he agreed, as if he had known it all his life. I did not publish my work on those bees and I have since wondered what I would have done if I had written a paper. Would I have accepted without demur the authority of the expert; or would I have given my result and admitted that the expert had said it was not correct?

To sum up: don't accept everything the seniors tell you, but look for possible alternative explanations and, in your own observations, don't jump to conclusions.

Frank Balfour-Browne (340).

Michael Farraday wrote: "The philosopher should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biased by appearances; have no favourite hypothesis; be of no school; in doctrine acknowledge no master. He should not be a respecter of persons, but of things. Truth should be his primary object. If to these qualities be added industry, he may indeed hope to walk within the veil of the temple of Nature."—Editor.

FADING OF GREEN INSECTS

Fading of green species, particularly the Emeralds, is almost certainly due to the chemical instability of the green pigment. If such fading is to be prevented, it is necessary to find out the precise reason for the stimulation of change. Age, light, and damp are the most likely possibilities; each one of which can be experimentally tested. It would be necessary to obtain a batch of specimens in as nearly the same condition as possible of a species subject to this fading. One batch should be kept in an ordinary cabinet or store box and treated in the usual way to act as controls. The second batch should be placed in a small box and completely buried in a container full of silica gel, which should be changed regularly and before it begins to turn pink: this will ensure that the specimens remain perfectly dry. The container should be kept in a cool dark place. The third batch should be exposed for a lengthly period to infra-red light and a fourth batch to ultra-violet light. A fifth batch should be placed in as damp an atmosphere as possible. From these groups, it should be possible after a time to determine what precise conditions cause the fading to appear most rapidly. I believe that the most likely causes are age and ultra-violet light. If the latter is the cause, the only thing to be done is to exclude as much ultra-violet light as possible from falling on the specimens. If the cause is age alone, a constant renewal of the specimens is all that can be done. The only other way to find out the cause and cure is by chemical analysis of the green pigment before and after fading. The chemical composition of the green pigment is likely to be different from the faded pigment. One might, therefore, find a way to restore the green tint by chemical means to its original chemical composition. Chlorine vapour is said to restore the faded pigments of certain of the Vanessids, and I can only suggest that this should be tried; but it should be remem-

bered that chlorine might make matters much worse, since I have heard that it turns the white of certain tropical butterflies of the genus *Delias* into a villainous purple! Nevertheless, the results of the action of chlorine on the green pigments, even if unsuccessful for our purpose, would provide useful information for further experiments. Such experiments with chlorine could be carried out with suitable precautions by anyone having access to a laboratory, but the analysis of the pigments would require the services of a professional bio-chemist. Fading may be due to minute quantities of certain gases in the air: cyanide, for instance, very badly affects these green colours. My hunch is that the best solution would be the provision of special glass on cabinet drawers; but I should like to read the views of other members on this subject.

R. E. Parsons (1512).

REVIEW

Flies of the British Isles by C. N. Colyer in collaboration with C. O. Hammond; pp. 383, 48 colour plates, 55 half-tone plates and many figures. Frederick Warne & Co., Ltd., London and New York. 30/-.

The commencement of this century, when G. H. Verrall published his two fine volumes on British Flies in a series never completed, saw the beginning of the now rapidly growing band of collectors and students of Flies. Verrall's nephew, Mr. J. E. Collin, with the late Dr. F. W. Edwards, followed and shared the Order between them. They have inspired many; but, alas, their work is hidden in diverse publications rarely of easy access to the amateur. 1949 saw the first of the Royal Entomological Society's Handbooks and the appearance of Mr. H. Oldroyd's excellent *Introduction*, now being succeeded by keys to each of the families, all of a very high standard.

There was however no adequate introduction to the flies for the nature student attracted to these insects until the appearance of this latest volume in Warne's Wayside and Woodland Series. In these days it is unusual for the amateur to have more than poor library facilities at home and he has rarely a ready access to type collections. Therefore an abundance of accurate plates, preferably coloured, are essential if his interest is to be served. Warne's have given us a first class production of Hammond's beautiful drawings. They are life-like in colour and well prepared from the originals which have so delighted those of us privileged to have seen the artist's work. The figures are large enough to enable each species to be correctly identified by a beginner and especially valuable are the insets depicting diagnostic features of the species concerned.

To compress an adequate account of the 5,300 or so flies recorded from Britain, has been Colyer's unenviable task. He has tackled it with great success. The book is a very readable work, concerned mostly with discussing the features and the ways of life of the flies selected for illustration by Hammond. An introductory chapter, with very clear diagrams, explains the structure of the fly and its early stages. The various families are grouped and treated in the following chapters, with keys to the families in each group interspersed through the book. Each family has its synopsis of diagnostic characters, its citation of literature. These are admirably selected and should prove very useful. But the bulk of the matter relates the life histories and field observations in a manner which invites a request for expansion and discloses the many gaps in our knowledge of the habits of many of the most abundant flies. It should inspire further pioneer work.

The volume ends with advice on the collection, preservation and examination of flies; a very comprehensive glossary of some 350 items; and a complete index. The full cross references to the illustrations will be much appreciated by readers, who will also be glad to see that the authors have not been too shy to show themselves, in illustration of their gear.

Misprints are rare and the small smudge on the wing of *Oscinella frit* on Plate 81 in our copy is the only blemish noted in the plates.

To sum up, we have here a very fine book by two amateurs which will mark the opening of an epoch in British Dipterology, inspire many to add to our knowledge of the lives of flies and bring much enjoyment to those wise enough to follow in the footsteps of the authors.

L. P.

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A E S

BULLETIN

No. 131

NOVEMBER 1951

STORING A LARGE COLLECTION

When I began collecting moths in Africa, I had to decide whether I would make store-boxes for myself, or keep my collection for ever in papers: for the price of proper store-boxes, even when they were obtainable, put them quite beyond my reach. In fear and trembling (for I am no carpenter), I decided to make them. They are by no means the " professional " article: but I have had my collection stored in them for many years, and the insects keep in excellent condition, which is the most important point.

Now, no one who is skilled in joinery and carpentry should read any further. This article is not for them. It is written to encourage those others who, like myself, just know how to use simple tools without spoiling them, and whose purse is slender, to "have a go". These boxes are essentially cheap. They share with the ordinary storebox the disadvantage that the contents are not under glass: but glazed containers can never be cheap. They are intended to be kept flat; not stood on end as storeboxes often are; and a simple rack for them is easily made, so that they become in effect drawers rather than boxes, and the whole affair becomes a sort of unpretentious cabinet. My boxes are, for a special reason, $15\frac{1}{2}'' \times 12'' \times 3''$, and the following instructions deal with a box of that size. But whatever size of box is chosen, the principle will remain the same. As for wood, I obtain mine from small crates and packing-cases, picked up for nothing, or next to nothing, at various shops. The wood in these is usually about $\frac{3}{8}''$ thick, with occasional pieces of $\frac{1}{2}''$. So, having obtained some wood, proceed as follows.

First, cut and plane up two pieces $\frac{1}{2}''$ thick, $11\frac{1}{2}''$ long, and $2\frac{1}{2}''$ wide, and then two more pieces $\frac{3}{8}''$ thick, $15\frac{1}{2}''$ long, and $2\frac{1}{2}''$ wide. Be sure that the ends are square, and the long edges straight, square and parallel. Take one of the longer pieces, and draw a line AB (fig. 1) squarely across it, exactly $\frac{1}{2}''$ from one end. Draw another line, CD, on the end of the piece, $\frac{1}{8}''$ from the side already marked, and similar lines, CE and DF, on each edge. Join EA and FB, using the square. Cut along the lines AB and CD with the saw, until the two cuts meet along EF. Then the small bit of wood will come away, and you will have a "rebate" $2\frac{1}{2}'' \times \frac{1}{2}'' \times \frac{1}{8}''$. Do the same at the other end of the piece of wood, on the same side of it; and at both ends of the other long piece. Holes must now be drilled in both pieces in the exact positions shown in fig. 2. You will see that hole "A" is further from hole "B" than "B" is from "C". Make sure that the "A" hole at each end of the bit of wood is near to the same edge, or you will get into difficulties later on. These holes should be countersunk for the screw-heads, and drilled to a size that will just allow the screw to be pushed through. Use thin screws: No. 3 $\times \frac{3}{4}''$ is a good size. Now fit one long and one short piece together, and mark the places where the screws will come in the ends of the short piece. Drill very small holes for them: $\frac{1}{16}''$ is big enough. Insert these two screws, but do not drive them more than half-way in. Now place the other short piece in position at the other end of the same long piece, and mark and drill holes for its screws. Insert these also; but again do not drive them right in. Lay the thing on the bench, with the "A" holes at the bottom, and put the second long piece in position. When you are fitting it, be sure that its "A" holes are also at the bottom. Mark and drill the holes for its screws in the free ends of the two short pieces, and insert the screws. Smear Seccotine or other glue on the wood-surfaces that will come together, drive all 12 screws well home, and you will have a frame (see fig. 3) $15\frac{1}{2}'' \times 12'' \times 2\frac{1}{2}''$. Lay this frame on the bench, and test it for squareness. Drive nails, if necessary, into the bench, outside the corners of the frame, to keep it square while the glue sets.

The best possible tops and bottoms for these boxes are of 3-ply wood. But 3-ply is expensive; and we are making the boxes "on the cheap". So cut out pieces of your $\frac{3}{8}''$ wood, $15\frac{1}{2}''$ long, for the bottom of the box. The number necessary will depend, of course, on the width of the wood you have available. There must be enough to cover the frame completely when laid on it side by side. Of

course, if you have the necessary planes for making rebates, or tongues and grooves, you will make the joints between these "floorboards" in a professional manner. But if you have these things, and can use them, you will probably not be reading this article at all. So, if you have not a single piece of wood wide enough to make a complete bottom, cut as many as are necessary, and plane their edges carefully, so that they will fit well together. Now take care. The bottom must go onto that side of the frame nearest to the "A" screws; NOT onto that where the "C" screws are. The boards are fastened on with glue and fine brads, each board being pressed up hard against its neighbour while being nailed. You will, of course, have put some glue on the edges of the boards. Then get some bits of stiff wire, and cut it into 2½″ lengths. Sharpen each end of a piece with the file, and bend the two ends up squarely for ⅜″, thus forming a sort of wide staple. Two of these staples will be needed for each joint between boards. Hold a staple across the joint, tap it lightly so that the points will make their marks, and bore holes of a size to fit the wire tightly. Drive the staple in from the outside of the box, when the points will project inside it for about ¼″. Support the floor on some firm and hard surface, and turn the points over with the hammer, knocking them well into the wood. Fig. 3A will give you the idea.

For the top of the box get some very thick cardboard. Fasten this on with glue and fine nails. These nails must not be more than ¾″ long, and are set about 2″ apart all round the box. You will now have a box 15½″ × 12″ × nearly 3″: but it cannot be opened. So make a very carefully measured line all round the entire box, exactly ¾″ from the edge of the wood to which the cardboard is glued, and then saw through the wood along this line. This marking and cutting must be done with the greatest care. Hold the saw quite square, and if the job is well done, you will have a perfect joint between box and lid. In order that the box may be reasonably air-tight, it is well now to brush some melted paraffin-wax into all the corners, and along all edges of box and lid, on the inside; also along the joints between floorboards, and into any old nail-holes or cracks in the wood. (Paraffin-wax is easily melted if shredded up with a knife, and put into a small tin. This is stood in a larger tin containing very hot water. The water must not be allowed to get into the small tin.)

Now we come to the covering of the floor. Sheet cork is of course the best if you can obtain and afford it. I could not get any: so I used soft fibre-board, of which there are several makes, used for ceilings, etc. It gives a most satisfactory hold to the pins. A little judicious snooping round builders' premises will sometimes yield pieces that are too small to be of use to the builder, but will do admirably for your boxes. But take a pin with you, and make sure that you have the soft kind of board: some kinds are too hard. It should be fixed by thin brads, set not more than ½″ from the edges of the box. One brad near each corner, one in the middle of each short side, and two spaced out along the long sides. The brads must be driven in *sloping*, not vertically. Sometimes it is advisable to put one more in the exact centre of the box. By the way, most fibre-board has one side smoother than the other. You will naturally put this side uppermost. When your covering is fixed, cut strips of your thick cardboard to fit all round the box inside, standing on the fibre; they must be wide enough to reach up ½″ above the top of the wood. A section of one of these strips is shown, shaded, in Fig. 4; and you can see them again in Fig. 8. They must be cut square at the ends, so that they will meet well and truly in the corners of the box. Fix them with a few short nails. When the box is shut, the lid will fit tightly outside these strips. Perhaps, when you try the lid, you will find that it jams on the strips, and will not shut properly. Good: you have made a tight fit. Round off the inner edges of the lid with the file, or shave them with a sharp knife, until the lid fits down tightly, but without difficulty, round the strips. At this point, the whole outfit should be well sand-papered outside, and all corners and edges rounded slightly with the file. A bit of time and elbowgrease spent on this part of the job will be well repaid by the better appearance of the finished box. Now fit two small hinges at the back, 2″ from the ends. These *should* be countersunk into the wood: but if you are afraid you will not make a neat job of this, they will work quite well if just put on at the back, as shown in Fig. 5. Two small brass hooks at the front, with eyes on the lid, complete the box outside.

If everything has gone well so far, the box is ready for papering. Cut strips of fairly thin white paper, 5″ wide, exactly the length to fit the sides and ends of the box inside the cardboard strips. Each strip is fixed soaked in water, then

THE FIGURES ARE NOT DRAWN ACCURATELY TO SCALE.

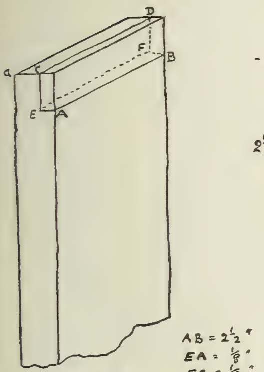


Fig 1.

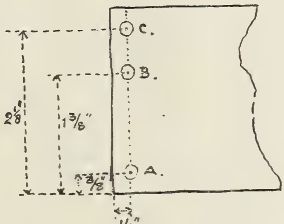
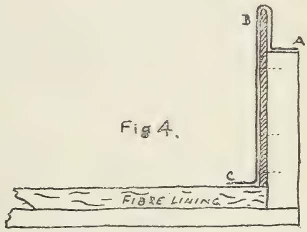
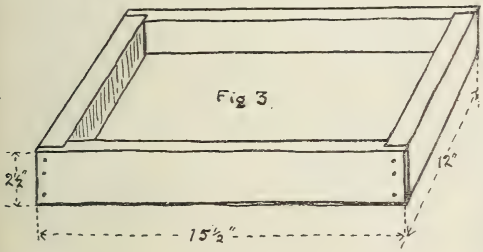


Fig 2.





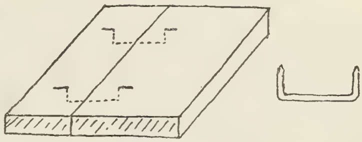


Fig 3A

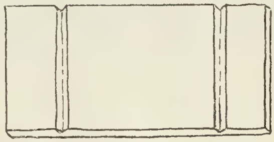
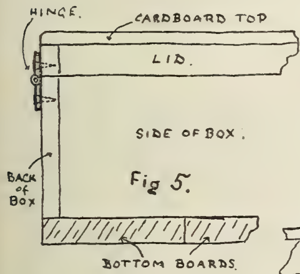
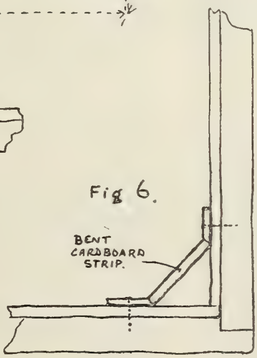


Fig. 7.





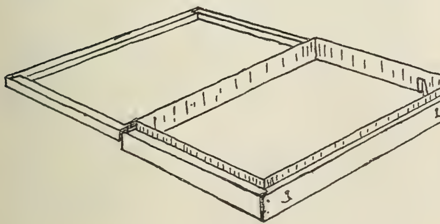
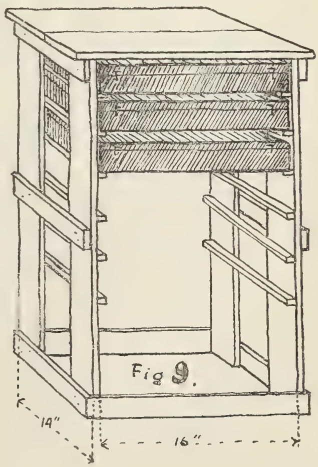


Fig 8.



gummed or pasted, and put in place, covering the edge of the wood outside the cardboard, coming over the top, down the inside, and lying a little way out into the box, on the floor. If this is not clear, look at Fig. 4, where the paper is shown as the line ABC, and the shaded part represents the cardboard strip in section. When all four papers are in position, cut small square pieces of paper and paste them in the corners to cover the joins between the long strips and make all neat. For the floor, cut a piece to fit: soak and paste it, and lay it carefully, smoothing it out as well as you can. There may be small wrinkles in it: but if they ARE small, they will disappear when it dries. If you have used fibre-board, it is well to fix the paper down also with small "office-pins", set round the edges, and pushed into the fibre right up to their heads. Leave the box open until all the paper is absolutely dry—this will take some time. Then, very gently, try whether the lid will shut. Probably not, until you have shaved the inner edges a bit more. When you are satisfied that it will shut without injuring the paper, your box is ready except for one thing—the compartment for naphthaline or other preservative. A bit of the thick cardboard is cut, $3\frac{1}{2}''$ long, and wide enough to reach up from the floor to about $\frac{1}{4}''$ from the top of the sides. It is bent as shown in Fig. 6, and nailed to the side and end of the box in one corner. To bend it neatly, make pencil lines where the bends are to come, and with a sharp knife cut V-shaped grooves along these lines, cutting about half-way through the cardboard. (See Fig. 7). It will bend neatly and easily along these cuts. Cover it, also, with white paper when in place.

Your box is now finished, and I hope it is successful. (Fig. 8). A rack, in which these boxes may be kept, is very easily made. There is a suggestion for it in Fig. 9. Dimensions will naturally depend on the number of boxes you wish to accommodate. One about 3′ 6″ high will take 10 boxes. The depth from back to front should be such that the boxes, when pushed in flush with the side-frames, will be 2″ away from the wall. The runners at the sides are $\frac{3}{8}''$ thick, and (for boxes 3″ deep) their centres are $3\frac{5}{8}''$ apart. When your collection outgrows one rack, you can very easily add another by taking off the horizontal battens on the outside of one upright frame, putting runners on the frame on the outside, making one more frame with runners, and extending the top, and the skirting board at the bottom. If you stain the whole rack, and the boxes, some dark colour, you will considerably improve the appearance of the outfit.

A. L. H. Townsend (1691).

Another member, Mr. N. J. Austin (966), has stored his insects in home-made cabinet racks for years, but on open shelves and not in boxes. He writes: " I am afraid that the aesthetic side of my cabinets doesn't worry me; they have to serve my purpose of housing insects, which, being dead, cannot expect a palace! I am fortunate enough to have a small room all to myself and my bugs, so appearance isn't a primary concern.

" My insects are mounted and arranged on sheets of Essex boarding. This I obtain either from builders' dumps or in some barter exchange. It must not be confused with plaster-board which wont take pins. Even with Essex board small pins may bend when being stuck in, so I either make the hole first with a mounted needle or mount the small pin on a piece of Elder pith (Nature's free supply) and this is put on a stouter pin not liable to bend under the required pressure.

" The shelves are removable, being supported in the cabinets by simple brackets (L-brackets, headless nails or battens of wood). The cabinets are old radio cabinets because of my connections with the trade: but they could equally well be grocers' boxes or something else inexpensive.

" No doubt other members will be shocked at the idea of leaving the insects exposed; but if they are treated by immersion in a solution of 1 gramme of Corrosive Sublimate of Mercury dissolved in 2 ounces of Ether or Industrial Spirit and dried, they will not be attacked by mould or mites. The only thing they must be protected from is light. Anyway, I have seen elaborately housed collections ravaged by mites and moulded.

" My advice to anyone who wishes to 'make rather than spend' is first to survey the materials freely available or obtainable, and then use gumption, plus a minimum knowledge of the use of common tools."

CANNIBALISM

I obtained from a friend in June some ova of *Philosamia obscura*. The larvae duly hatched out and appeared perfectly fit and well after the first skin-change. There were some sixty-five of them, all feeding happily on privet. The supply of foodplant was at all times ample and moist. One day, to my horror, I discovered that the numbers had shrunk to forty, and on investigating the tin I found that there were remains of what appeared to be a cannibal feast. They were then kept under close observation during the day (when nothing out of the ordinary happened) but during the night more havoc was wrought and by morning their ranks had shrunk to twenty. I observed them closely during the following night and found that the young larvae would be contentedly eating a leaf and, if they ate right through it and came across the hindquarters of their neighbours, they would stop at nothing and would hungrily devour their late friends, starting from their nether parts and gradually work upwards.

In parenthesis, I would like to remark that people have said to me that insects feel pain. My reply to this is that I don't think the *obscura* larva that was being eaten had any idea what was happening until the aggressor had removed at least half his body.

Having confirmed this cannibalism, I then marked down the offenders and isolated them, and I soon found that I had eighteen caterpillars in as many separate tins. They all fed normally and " spun up " in the normal way. Three weeks later some ten moths emerged and I obtained two pairings (there were no aberrations in the moths). I sent one lot of some four hundred and sixty eggs to a friend in Surrey: the remainder I kept, and, out of a total of three hundred and three eggs, only ninety-two hatched. The larvae were again fed on privet, but from the start did not seem very fit; over a period of the next two weeks there were some repeated cases of cannibalism. By a stroke of bad luck I was away at the crucial moment and, returning three days later, found all but two dead at the bottom of the cage. My friend, however, had considerably better luck with his and I believe there are about seventy larvae which in the first two stadia exhibited cannibalism.

I am assured by experienced fellow-members of the Silk Moth Group that *Philosamia* larvae are usually very gregarious and feed up in companies side by side. Normally the only risk is of those which grow most quickly shouldering out the laggards. It will be interesting to see if this is an inheritable tendency which may be shown by a third and later generations.

J. A. Dale (1206).

Mr. R. H. Benson (1444) reports that a fully-grown larva of the Poplar Grey moth (*Apatele megacephala*) ate up a smaller one placed in the same cage. Is this a regularly cannibalistic species?

●

REARING THE SMALL EGGAR

To rear this species (*Eriogaster lanestris*) the whole nest must be cut out and the bough kept intact. A lot of these nests contain far more larvae than most collectors require, so choose the smallest you can find. When you get home, put the bough containing the nest in a bottle of water within a cage of suitable size. Now get other bottles and put your food in these (I don't mean bread and cheese).

The food must be the same as that on which your larvae were feeding when you found them.

Fresh supplies of the same foodplant should be put in other bottles close alongside the first one, so that there is contact with the branch bearing the nest. Renew these supplies as necessary, but leave the nest intact.

The nest gets into a fearful mess from frass, before the larvae are full fed; but this does no harm, if kept dry. You can give sun when possible, but not through glass.

When you think the larvae are ready to pupate put sterilised moss in the bottom of the cage to a depth of two inches. You will find that they will roll up in this and that no soil is required. Do not be surprised if the moths do not appear next season. One of my moths emerged after four years and they have been known to remain alive in the pupal state for seven years.

E. Harrison (1676).

LETTERS TO THE EDITOR

Dear Sir,—For some time now there has been controversy about the propriety of the use of "Robinson" pattern light traps, particularly when used in conjunction with Mercury Vapour Light.

As our names are linked with the origin and development of this method of collecting Lepidoptera and other insects, we should be grateful if you would spare us space to state our views on the ethical standards involved.

To anyone who has used, or seen used, an "inverted cone" trap with a source of light producing ultra violet radiation in excess of that obtained from ordinary filament lamps, there can be no doubt of the enormous increase in numbers of insects taken in comparison with any method of collecting hitherto known. The very large catches taken are of insects which would normally be in flight only within about 50 yards of the trap and therefore, in the case of common or wide-flying species, their extermination would be a matter of no moment from the point of view of survival of species. In the case of insects of local occurrence, however, the matter becomes one of considerable importance and the killing of a catch of such insects may lead to the reduction of a species, local in one area, to a level of population below which it cannot survive. In any case, it is in our opinion wrong to kill wantonly any insects, however common, unless some really useful purpose is served by such an action.

It must be obvious that the thoughtless or unscrupulous use of any agent which will kill the contents of such a trap is capable of doing very great damage to any local species and the use of such agents should be discouraged. Further, if an agent is used, the effect of which in certain dosages is anaesthetic, e.g., Tetrachlorethane, it should be noted that, if the insects are left in the trap after the sun has been on it some while, it will be found that all are dead from desiccation.

The great numbers of insects obtained are, in the main, useless to the person forming an ordinary collection of *Lepidoptera* who, normally, wants only a short series of each species. The danger of the apparatus lies in the possible destruction of *all* the insects caught, whether wanted or not. To the ordinary collector, there can be little doubt, a Mercury Vapour Lamp suspended over a sheet and watched for the arrival of desirable species should be a perfectly satisfactory method of collecting. Not only is there more fun in such a pursuit, but the danger of killing the whole of the insects which arrive is eliminated.

The Robinson trap is really a piece of research apparatus and, in our opinion, should be used as such. It is of inestimable value for sampling and statistical purposes and no other type of apparatus can approach it in efficiency for this type of work.

We do feel that it should be used carefully and that its use imposes the moral obligation of ensuring that all insects which are not required are released alive.

The gravity of the matter is increased by the trend of new developments. We are at present using apparatus, powered by a 3 kilowatt generator, of quite fantastic collecting power.

Although we do not intend to release details of this and other developments, similar construction is within the power of any competent entomologist with a knowledge of physical principles.

If carelessly used, the operation of such an apparatus for a single night may do incalculable damage in ecological unbalance.

In fact, we use the utmost care to see that no insects are killed which are not required and that the apparatus is not used at all where very local species are concerned.

To make our own position quite clear, we should like to state that the development of this means of collecting and sampling has led us both to cease personal collection of British *Lepidoptera* as we feel that the apparatus should be used for the benefit of the National Collection and not for the enrichment of private collections. We have, accordingly, placed our apparatus and such time as we can afford at the disposal of the Department of Entomology, British Museum (Nat. Hist.) to carry on field research on the British Insect Fauna, particularly the *Lepidoptera*.—Yours faithfully,

E. W. CLASSEY (41).
H. S. ROBINSON (1518).

Dear Sir,—Referring to Mr. Paul H. Holloway's note under the title " 1951: The Late Season " (*p. 97*) I would like to record for his benefit the dates of the first appearance, in my trap at Weybridge, of the five moths he mentions. These are as under:—

Spring Usher (*E. leucophaearia*), 19th January.
Pale Brindled Beauty (*P. pedaria*), 25th January.
Dotted Border (*E. marginaria*), 4th March.
Oak Beauty (*B. strataria*), 8th March.
March Moth (*A. aescularia*), 19th January.

According to my records, the emergence of most of the insects I take has averaged since the end of April, seven days later than in the two previous years. I think also it might be of interest to report that for the first time since operating my trap in North-West Surrey, I took in August a Brighton Wainscot (*Oria musculosa*) in perfect condition.—Yours faithfully,

A. A. Best (1202).

MOTHS OF THE DARK MONTHS

At the approach of winter many entomologists are inclined to ruminate on the success, or otherwise, of the fading season, and anticipate eagerly the thrills of another summer, travelling to new fields of activity where something which has so far eluded them will adorn their cabinets. Rightly so, this undying enthusiasm, but what of the interim period? Why fold up the nets and wait? The Sprawler (*Brachionycha sphinx*) gives us a good start in November in many counties; the December moth (*Poecilocampa populi*) is equally well represented, and quite easy to breed. Herald moths (*Scoliopteryx libatrix*) are to be found hibernating in a variety of situations, as is the much scarcer Tawny Pinion (*Lithophane semibrunnea*), to quote but two examples, and many are in perfect condition when thus obtained.

The Geometers, however, are my favourites, especially the Mottled Umber (*Hybernia defoliaria*). South quotes October to December for the moth, and *occasionally* in January, February or March, but in my experience January is the best month for it. A visit to any oak woods during winter with a bright torch and a net should result in plenty of specimens, providing a reasonably warm night is chosen, and, after all, this species is so fascinatingly variable that a fair amount of cabinet space can reasonably be allotted to it and it is so common that by showing two or three rows we could hardly be accused of over-collecting. A light trap, of course, is even more effective. Sharp eyes can detect the females on lichen-covered oak trunks fairly easily; most commonly, I find, in January. By the time we have finished with *defoliaria* the other winter and early spring Geometers with wingless females will be attracting attention, and the fact that there are comparatively few species at this time of year gives us more time to study them fully.

After all, with the panic of breeding and collecting over, have we not more time during the dark days to become specialists in the ecology and genetics of our chosen order or family of the Insecta? This we can do by the study of books and papers, our own records of field work and breeding and, perhaps equally important, the examination of our specimens. With the return of spring let us be able to look back upon the interest and success of an entomological winter.

Paul H. Holloway (429).

IN PRAISE OF CELLULOSE WADDING

I have found this wadding (as sold by chemists) much better than cotton wool for supporting bodies on the setting board and for the bottom of the killing bottle. It is not "whiskery", and is most satisfactory as the absorbent in the relaxing tin. I also use it instead of moss in the pupa cage—a layer on the bottom and shreds over the pupae.

In conjunction with cellulose wadding I have found Thymol very satisfactory in preventing mould in the relaxing tin. A crystal the size of a pea, melted in half a cupful of boiling water and poured on to the wadding as required, is all that is necessary and does not affect the relaxing of the specimens.

John E. Knight (94).

DWARF IMAGINES

Referring to Paul H. Holloway's article in *Bulletin No. 128* on the January emergence of Large White, I had an even smaller *Pieris brassicae* hatch on February 17, 1951. It measured only 50 mm. from tip to tip across the forewings, although in perfect condition. The chrysalis had been kept in the livingroom, which always had a fairly warm temperature owing to constant fires throughout the winter.

On April 4, 1951, a dwarf female *Anthocharis cardamines* (Orange-tip) emerged in an unheated room. It measured only 34 mm. across the forewings, instead of the normal 45 mm. Yet both pupa cases were of normal size.

ALAN D. KINDRED (1707).

AES ADVISORY PANEL

Will members please add to page 82 of *Bulletin No. 127* under the heading "Lepidoptera" the name of Professor J. W. Heslop Harrison (716), who is willing to advise on hybrid lepidoptera—and also on insects and plants of the Inner and Outer Hebrides.

FIELD MEETING AT SHAWFORD DOWNS, HAMPSHIRE

July 15th, 1951, was a fine, warm day; high cloud obscuring the sun; little wind. The season being late, very few species of butterflies were observed on the chalk downs. *Lysandra coridon* was absent, whereas, normally, a few males of this species are seen in this locality by mid-July and later it becomes extremely abundant.

At 2 p.m. five AES members and three visitors set forth, and the following Lepidoptera were recorded:—

Melanargia galathea and *Maniola jurtina* were both quite common.

Maniola tithonus made a first appearance.

Coenonympha pamphilus and *Thymelicus sylvestris* appeared in small numbers.

Polyommatus icarus: one very worn female only.

Zygaena trifolii common: many specimens examined but no variation reported.

Callimorpha jacobaeae: still flying, but in bad shape.

Tea in the restful atmosphere of Fisher's Café, followed by a stroll in the vicinity of Fisher's Pond, where *Phalera bucephala* was found at rest on a tree, brought to a conclusion a most enjoyable meeting of enthusiastic entomologists.

PAUL H. HOLLOWAY (429), Leader.

REVIEW

Collecting and Breeding Butterflies and Moths by B. Worthington-Stuart; pp. 190, coloured frontispiece and 17 figures. Frederick Warne & Co. Ltd., London and New York; 1951. 10/6.

Messrs. Warne & Co. have done so much to earn the gratitude of naturalists in general, and entomologists in particular, that one hesitates to condemn this, their latest well-intentioned publication. It is, however, far below the standard to which we are accustomed from their House: its only really good passages being extensive quotations from works they have already published. The author has certainly read fairly widely and culled a great deal from publications of the AES, which, however, he describes as the Amateur Entomological Society. This is typical of his slipshod writing, which permits him to state that "glass jars attract the sun's rays" and that larvae back out of their old skins in moulting. He refers to rheumatism as a prevalent disease of larvae; and says that frass dropping into the water-jar poisons the water which is "absorbed by the leaves, which in turn kill the caterpillars." (Leonardo da Vinci tried injecting poisons into the trunks of peach-trees to see if the fruits would be poisonous and found it didn't work.)

On the practical side Mr. Worthington-Stuart is little better. He seems never to have heard of the beating tray and refers to glueing glass to glass, canvas to glass, and zinc to wood with glue of "cabinet-maker's" quality. Only a special glue containing potassium bichromate is likely to be effective and that is most unlikely to be used by a cabinetmaker. Altogether it seems that Messrs. Warne & Co. have this time "bought a pup" and we do not recommend any of our members to do likewise.

W. J. B. C.

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of the

Amateur Entomologists' Society

in print November 1951

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH M.A., A.K.C.

A E S

Members can help the Society in several ways:—

(a) By dealing with advertisers and mentioning the *Bulletin.*

(b) By bringing in new members. (Subscription, 10/- per annum. Juniors, 5/- per annum.)

(c) By friendly co-operation with other members.

(d) By taking just that extra bit of trouble required to record happenings of note for the *Bulletin.*

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AES BULLETIN No. 132 DECEMBER 1951

OUR INTERESTS

Not all the members whose names were printed in the July *Bulletin* (The Membership List) indicated what their interests are. Many showed a general attraction to Natural History or Biology or Zoology; but it is enlightening to analyse the special interests recorded by the majority. They are best brought out in a table:—

Order.	First choice.	Later choice.	Total.
Lepidoptera	578	32	610
Coleoptera	70	60	130
Hymenoptera	34	45	79
Diptera	18	17	35
Odonata, Trichoptera, Ephemeroptera	30	39	69
Hemiptera-Heteroptera	7	6	13
Neuroptera	—	4	4
Orthoptera	—	3	3
Arachnida	5	3	8

Very special, but unparticularised, interests such as "veterinary entomology" or "parasites" have perforce been omitted.

One is immediately struck by the predominance of the lepidopterists—and also by the fact that so few of the lovers of other Orders show any interest in butterflies and moths. On the other hand, the *Coleoptera* are a secondary study for nearly as many members as are out-and-out "beetlemen." There are fewer first-choice hymenopterists than secondary; but one suspects that a number of, say, lepidopterists are bee-keepers. Strictly speaking, spiders are not within the field of Entomology, since they are not insects: but the AES has always welcomed the arachnologists to membership.

It would be an amusing Christmas holiday task for some of our Junior Members to measure up the number of inches devoted to the above Orders in the bulletins for 1951; and to compare the results with the proportions shown in the total column of the table. It is unlikely that the less studied Orders will have had an equitable amount of space given to them: but that, the Acting Editor must plead, is no fault of his. The remedy lies with the specialist members themselves. Will they please note that their contributions would be very welcome during 1952 and, since they are least accustomed to writing in, will they remember to type or write on *one* side of the paper only?

W. J. B. C.

AES ANNUAL EXHIBITION

The Festival Year Exhibition, held in London on 22nd September, was perhaps the most successful in the Society's history. Attendance was good and it was particularly satisfactory to see so many young people present.

Entomological exhibitions are apt to consist largely of set specimens of the Macro-lepidoptera, but on this occasion other orders were very well represented. There were five exhibits of Coleoptera, three of Orthoptera, two of Diptera, one each of Neuroptera (in the wide sense) and Heteroptera, and one "mixed bag."

Of the Coleoptera, Mr. F. L. Hatcher's nicely set drawer of *Cerambycidae* deserves mention, though no data were visible; and Mr. E. Lewis's neat box of *Carabidae* from a small strictly limited habitat—a heap of rubble by a river near the coast in Sussex—with accompanying sketch-maps of general distribution, commended itself, not only for its execution, but for the interest and originality of the underlying idea.

The exhibits of *living* Orthoptera were an excellent feature of the show. From Mr. G. B. Collins we had four species of *Chorthippus* (*bicolor*, *albomarginatus*, *parallelus* and *vagans*), as well as three well-set boxes of various British Orthoptera (including *R. roeselii* from a third locality on the Surrey downs); from Mr. D. H. Peel the Tettigoniids *Pholidoptera griseoaptera*, *Metrioptera brachyptera* and *Roeseliana roeselii*; and from Mr. P. J. Walker *Leptophyes punctatissima*. The Orthoptera Group, even though it has scarcely yet begun to function as a group, may well feel encouraged at this evidence of interest, and we hope that the enterprising exhibitors will not forget to send in any notes or observations that they may have, for publication in the *Bulletin*.

The Diptera were represented by Mr. F. L. Hatcher's exhibit of a serious statistical investigation of the Dipterous population of a small patch of cow-dung—clearly no light undertaking; and by Mr. L. Parmenter's exhibit of specimens of some of the species figured in Colyer & Hammond's recently published *Flies of the British Isles*, with the actual plates for comparison.

The modest owner of the excellent "Neuroptera" exhibit had failed to attach his name. Lacewings (green and brown), snake-flies, alder-flies and scorpion-flies were all represented by well-set imagines, and in some cases by eggs and larvae.

A very *recherché* box of Heteroptera was shown by Mr. R. G. Shaw: probably few "ordinary" entomologists, and by no means all heteropterists, are on terms of familiarity with *Eurygaster maurus* (Pentatomidae) and *Ischnodemus sabuleti* (Lygaeidae), which, with *Thyreocoris scarabaeoides* and *Aradus depressus*, made up the select company. We hope our junior council member will be able to let us have notes on some of these interesting species for the *Bulletin* in due course.

The "mixed bag" was provided by our President, Mr. B. L. J. Byerley, in the form of a selection of specimens including the largest British species of e.g. Tettigoniidae (Orth.); Ichneumonidae (Hym.); Tipulidae, Asilidae and Larvaevoridae (Dipt.); and some interesting Dipterous rarities—altogether a very instructive exhibit.

Even among the Lepidoptera, many of the exhibits were unusual and by no means confined to "what the other fellow caught." Some thirty of the cages described in our "Practical Methods and Hints for Lepidopterists" were shown and created great interest, which was reflected in the sales of that publication. Two exhibitors showed collections of Pugs, which so often prove difficult for the novice to classify. Several others compared local races of various species. A case of moths set to show the undersides was a new idea which other members might well copy in their collections. Many visitors cast envious eyes on a case which included a Large Copper (*L. dispar*) dated 1827. Living larvae were shown in good numbers and there was one pupa of the Death's Head Hawkmoth (*A. atropos*). An album of excellent paintings by Mr. R. G. Gully of Sphingid larvae suggested that this is perhaps the best way to preserve this stage of lepidopterous metamorphosis.

The Silk Moth Group demonstrated its aliveness by exhibits spreading over three tables. They showed set specimens of a number of rare Saturniids, including five species from Africa, *Nudaurelia tyrrhea*, *N. gueinzii*, *N. richelmanni*, *Cirina forda* and *Bunaea alcinoë*, reared through the complete life-cycle in this country probably for the first time. Of the first of these a fine series of photographs showed every instar from ovum to living moth. Some of them had been coloured by Mr W. R. Smith, the energetic secretary of the Group. A living *N. gueinzii* larva attracted attention for its scaliness. There were other Saturniid larvae, including one of *Attacus edwardsii* of truly enormous size and weighing about 300 gr.

One of the most enterprising and praiseworthy items in the Exhibition was the work of a school. Ranby House School, Notts., one of our newest Affiliate Members, after only one term's membership produced a series of 27 "leaflets" (suggested by the AES series) on a remarkably wide selection of groups and topics, each one written and illustrated by a different pupil. Thank you, Ranby House, for your most stimulating and sporting contribution: we hope you enjoyed writing your "leaflets" as much as we enjoyed looking at them.

The lecture rooms were overflowing with interested audiences for each of the lectures. Major Maxwell Knight spoke on "Entomology in relation to other branches of Natural History," Miss Cynthia Longfield on "Dragonflies," and Mr. E. E. Syms on "Entomology and the Camera."

Demonstrations were given of how to set Coleoptera and Diptera; and several of the younger entomologists enjoyed recording interviews for the B.B.C. Children's Hour.

It was an enjoyable afternoon. One met old friends and made new ones, picked up new ideas, saw what other members are doing, and, above all, felt a pride in membership of such a live Society. If you missed the exhibition this year, make sure of coming in 1952.

H. K. A. S.
L. W. S.

DRAGONFLIES

(This is the substance of a talk given at the AES 1951 Exhibition)

Eggs—The eggs of dragonflies are mainly laid in two different ways: either inserted in the tissues of plants or dropped freely into the water. All the eggs are pale yellow when first laid, but most turn a red-brown soon afterwards. The dragonflies that insert their eggs in plant tissues (the *Aeshnidae* and the Damsel-flies or Sub-Order *Zygoptera*) possess full-sized ovipositors. Most of the other British *Anisoptera* drop the eggs loosely or else in gelatinous strings, which melt in the water. Our one species of *Gomphidae* and our one species of *Cordulegasteridae* push their roundish eggs into the mud or sand of the river shallows. The length of time taken to hatch varies greatly between genera and even species. Three to four weeks is the usual time, but a few species will remain as eggs all through the winter for four to five months. In tropical waters they can hatch in as short a time as four days. Rates of growth of the nymphs are also enormously different for different genera and for the different broods of the same species, according to conditions of habitat and temperature. Broadly speaking, most of them take two winters from the laying of the egg to the emergence of the imago or winged dragonfly; but at times the whole process is accomplished inside twelve months.

Nymphs—These are the early stages of the dragonflies. Our British species live under water. They are known as nymphs, because the dragonflies or *Odonata* belong to the HEMIMETABOLA division of the class *Insecta* i.e. those insects that do not have a complete metamorphosis. In other words, there is no resting or pupal stage, apart from about twenty-four hours in most cases, when the nymph is unable to feed. The nymph and adult dragonfly are very similar in most fundamental structures e.g. the mandibulate mouth; compound eyes; segmented body and legs; and the tracheal system of spiracles. The underwater life of the nymphs has produced certain adaptations and modifications; most noticeable being the structure of the lower lip and the rectal and caudal gills. In all the dragonfly nymphs the lower lip has been converted into a most efficient and diabolical structure (known as the "Mask") hinged between mentum and sub-mentum and folded down between the legs when not in use. With large movable hooks on hinged lateral palps, and all of it being capable of being shot out forwards by means of powerful muscles, it grasps the living prey and holds it to the dragonfly's mouth while it is devoured. As the spiracles on the nymphs cannot function while they are below the water they are furnished with alternative methods of breathing. In the *Anisoptera*, or those nymphs with short spiny appendages at the tail end, the inside of part of the hind gut is greatly enlarged and lined with complicated plates of gills, formed from the epithelium and connected to the tracheae. Water is drawn in through the anus, the oxygen is extracted and diffused through the insect, and waste products are expelled with the water. When the nymph wishes to speed its progress, it does so by jerking itself forward by forceful expulsion of the water at the anus. on the jet-propulsion system, so that the same mechanism is used for breathing, secretion and propulsion.

In our slender Damselflies (the *Zygoptera*), the tail ends of the nymphs are furnished with three caudal gills, usually leaf-like in shape and criss-crossed with tracheae. The hindgut is not enlarged nor furnished with gill plates, but it is used as one means of breathing, as well as probably directly through the skin, because the nymphs continue to live if they lose their caudal gills. The latter are also used as sculls when the nymphs wish to swim through the water. They seldom do, as most of them are very sluggish and either lie on the bottom or just beneath the mud or else cling to stones, sticks or stems, or live holding on to the floating weeds. They grow by frequent moulting, casting the entire cuticle; sometimes this is merely an aid to growth, but often necessitated by structural development. In the Hemimetabolous insects to which the Dragonflies belong, the wings grow in cases externally, beginning as tiny outgrowths from the pleural ridges, and ending up in the last instars with the hindwings overlying the forewings. When first seen on the prowl, the tiny leggy nymph is really in the second instar (the stage between moults), for the first instar is a very brief stage called the "pro-nymph," because it comes out of the egg entirely encased in a fine membrane which

splits open. In many species this takes only a few seconds; in others it lasts several minutes. In the British species the usual number of moults is from ten to twelve, but nine or thirteen have been known. In normal water temperatures the average nymph would appear to moult once a month in the colder months and twice or even more in the summer. If it goes through a second winter as a full- or nearly full-grown nymph, then it feeds very little and does not moult at all after November, until it may cast " one more clout " in the Spring. Undoubtedly, with abundant food easily procurable and high summer temperatures on shallow ponds, dragonfly nymphs are capable of moulting every few days and developing extremely rapidly.

The development consists of many things and can be seen externally to consist of such characters as: an increase in the number of joints in the antennae and the feet (*tarsi*); an increase in the number of facets in the compound eyes (*ommatidia*); the appearance of the wings, *ocelli*, *cerci* and male *appendix dorsalis*; and both development and increase in size and numbers of all hairs, setae, spines and hooks. Internally, there are far too many complicated changes to cite in detail: but, to mention a few, the Malpighian tubules, the principal organs of excretion in all insects, increase from three in very young nymphs, to as many as fifty to seventy in fully grown ones and the adults; the ganglia of the nervous system migrate forwards at metamorphosis; some of the muscles entirely disappear, but a few groups either alter their positions or else only appear at metamorphosis; the rectum of the hind-gut shrinks to insignificant proportions in the adults. The very important reproductive system is developing all the time, even after metamorphosis, but there is no radical change in the circulatory system as between nymph and adult. The nymph is covered externally with a cuticle of hard chitinous plates, joined segmentally on the abdomen by tough but flexible chitin, which is capable of some expansion.

Imagines—When the nymphs are ready to emerge, they leave the water and climb up the nearest stems capable of bearing their weight; or in a few genera, like the gomphids and some others, they just climb out on to the bank. Some will walk quite a long way and even climb high up tree trunks, but others will go only a few inches above the water level. The strong nymphal claws are well dug into whatever surface they have selected, and as soon as the cuticle is completely dry, it splits along the centre of the thorax and across the back of the eyes. The thorax, wings, head and legs are the first to be drawn clear, and then the insect takes a rest of about a quarter of an hour. In the British *Anisoptera* (except for *Gomphus vulgatissimus*), the " rest " is accomplished while hanging backwards, head down. In all our *Zygoptera* (Damselflies) the " rest " is taken head up. In *Gomphus* hardly any rest is taken at all; it is one of those that emerge on the ground and it walks almost straight out of its skin. It is not known whether the " rest " is really such or whether the pause is in order to harden the legs, but as soon as it is over, the abdomen is drawn clear and both this and the wings are then rapidly expanded. A lot of energy is used up in bursting open the cuticle in the first stage, and a great deal is required in pumping up the compressed wings and abdominal segments.

The wings are composed of two transparent layers of chitin, with the space between filled with blood plasma and the surfaces braced by a complicated pattern of main-veins and cross-veins, created from thicker and darker chitin. The main-veins are hollow, as they were formed along the courses of the nymphal tracheae (which are withdrawn and perish at metamorphosis), and the hollows are pumped full of blood to aid in the expansion of the wing. These blood-canals are left, but the bulk of the blood, which gives a greenish milky appearance to the teneral wings, eventually evaporates and the two membranes fuse together. The abdomen, which is very soft and telescoped into the nymphal skin, also expands by the pumping of blood from the heart and the swallowing of air. The cuticle on each of the ten visible segments hardens, except for the inter-segmental joints, which remain flexible, as they did in the nymph. The dragonfly may take several hours to harden in our northern climate, and during that time it is particularly vulnerable to attack. To ensure that sufficient members of the species survive, the usual time for metamorphosis is just before dawn; but often the emergence is in daylight and any kind of " mass emergence"

caused by abnormal heat or other conditions, will invariably end in a terrific toll being taken. Any dragonflies emerging only a few inches above the water get attacked and eaten by frogs, as also do ovipositing females later on. Newly emerged dragonflies struggling to dry their wings or else on their first fluttering flight will be snapped up by any hungry bird in the neighbourhood. Those species whose metamorphoses coincide with a Sedge or Reed Warbler's newly-hatched nestful of voracious babies, have a slim chance of surviving, and the Warblers are by no means the only Avian enemies. Before the cuticle has hardened, the colours are very pale, although the pattern has actually been laid down either just before or during metamorphosis. The insect is known as " teneral " while it is still colourless, soft and with " glassy " wings. Later it becomes what may best be called " sub-adult." In this stage the wings will be very shiny, but no longer "glassy" or "milky"; the cuticle is hard; some of the colours, reds, yellows, and greens, will be well pronounced; but the gonads will not be fully mature, although some females will be found " in tandem " with a male I am not satisfied that these females are capable of laying fertile eggs; I think it is more likely that they have been seized by the males too soon. Normally, the females clear off into the trees and bushes as quickly as possible after the metamorphosis in order to avoid the importuning males until they are ready for mating—which may be several days They will then return to the water and are instantly pounced on by one or more males, who will often have quite a " scrap " over the possession of the lady. Very few go through any form of courting, but, amongst the British species, both the highly coloured Demoiselles (*Agrion virgo* and *A. splendens*) and *Platycnemis pennipes* with his broad white tibiae, undoubtedly do " show off." The *Aeshnidae* go in for the "caveman " stuff, swooping down on the female, catching her by the head with the claspers and whirling her up to the tree-tops. The *Libellulidae* are equally rough and often knock the female down. In the Damselflies, the males grasp the females by the neck, but, so far as I have observed, the latter are nothing like so battered during mating as are those of the larger genera.

When the winged dragonflies are absolutely adult (mature in the sexual organs), then often the males have changed colour once again. This time there are two different kinds of colour-change. Many of the hypodermal or subcuticular colours are affected: these colours lie just below the cuticle and are the brightest and the most difficult to preserve in dead specimens. The kind of change that occurs is the following: in *Gomphus vulgatissimus* the clear yellow turns grass-green; in the Aeshnas the teneral yellow soon becomes light green and now turns a bright cerulean-blue; the same kind of pigment must be in the species of *Coenagrion*, because they, too, turn from bright emerald-green to cerulean blue. In all these the females remain, on the whole, duller and greener. The greatest change occurs in the *Libellulidae*, considered by taxonomists to be about the most highly specialised Family. Here, in the British species, are to be seen, in the greatest perfection, the two kinds of pigment effects mentioned above. In *Sympetrum striolatum* and the other " red " *Sympetrum*, the mature male becomes a bright red on the abdomen and often on the head and thorax as well. Previously he has been a brown-yellow or tawny-yellow, just like the female. But even she, after becoming a very old lady (should she survive all the hazards of her precarious existence or should the summer be an exceptionally hot one) will begin to turn red, sometimes nearly as bright as a normal British male. In two out of three of our *Libellula* species and in both of our *Orthetrum* species a more unusual change will occur. As sub-adult males they were the same tawny-brown as the female; but as they mature there appears an exudation through the hypodermal cells and through the outer layers of the cuticle. It is known as " pruinescence," is directly caused by the maturation of the gonads and is, therefore, of mesodermal origin. It is always of a white or pale blue colour, and, when overlaying the abdomen of the males of *Libellula depressa*, *L. fulva*, *Orthetrum coerulescens* and *O. cancellatum*, the result is to turn them into bright Cambridge-blue dragonflies. The thorax is also pruinosed, particularly beneath: and indeed most very mature dragonflies of both sexes become more or less so. Of our Damselflies, the two species of *Lestes sponsa* and *L. dryas* are the

only ones that get "pruinosed" to any extent; but it is probably our wetter or more northern latitude that has kept most of the *Zygoptera* from this phenomenon, because their near relations in the Tropics have some of the most striking pruinescent effects of any of the genera. On the other hand, the forest species have very little, if any, pruinescence; and in the British Isles, the black and yellow *Cordulegaster boltonii* has none. This black and yellow pigmentation would seem to be yet another kind of colouration: it must be one of the cuticular pigmentations actually deposited in the outer layers of chitin. It is durable after death. Black and yellow pigments form the "ground-colour" of the body patterns, and, in the more primitive types of the *Odonata* seem to be the only pigmentation present. One other colour phenomenon should be mentioned, that is the "colour dimorphism" in some of the females. It would seem to be confined to certain genera which are wide-spread in the world. It occurs in its most noticeable form in both our species of *Ischnura*, *elegans* and *pumilio*. It also occurs in less striking forms in *Pyrrhosoma nymphula*, *Enallagma cyathigerum*, *Ceriagrion tenellum*, *Coenagrion puella* and *pulchellum*, and last, but by no means least, in the females of *Anax imperator*. The black pattern on many of the males and females is variable to a greater or lesser extent, according to whether the colonies are isolated or not. It is not known why some species (and even whole genera) are almost completely sedentary, while others are always wandering, sometimes covering hundreds of miles of land or sea. The frail Damselflies may easily get swept up on air currents and wafted away willy-nilly; it is more than doubtful if they ever "migrate" in the true sense. On the other hand, many of the *Anisoptera*, mostly in the Families *Aeshnidae* and *Libellulidae*, migrate either regularly or else at more or less frequent intervals. Some unknown urge sets them off and takes them in one direction, on and on till they have to stop from sheer exhaustion. A migration on a vast scale will often have an effect on other species of dragonflies that get gathered into the stream. Foes, as well as friends, will join the throng. Observers have more than once recorded other insects and birds all migrating together. Mostly the migrations have been to the north, the west or thereabouts; south seems to be a rarer direction, and I cannot recollect ever having heard of a migration due east! I wonder if we shall ever find out why?

CYNTHIA LONGFIELD (1039).

DIPTERA IN DECEMBER

Normally the winter is all too short for the dipterist. Collecting gear has to be cleaned and overhauled; the summer catch and bred material sorted and identified. Notebooks have to be brought up to date, indices completed and results published. However, the odd sunny day should tempt us out and we ought to spend at least a few hours each month in the field. There are still many flies to be obtained, some only about in the winter: for example, the Trichoceridae (Winter Gnats).

These dance in the air at windless periods and may vary in species from swarm to swarm. Watch for the rising females and paired couples dropping and try and breed them. In the wild they breed in rotting vegetable matter, such as root vegetables, fungi, and garden refuse.

Fungi will also attract many of the Fungus gnats (Mycetophilidae) and Helomyzidae. For breeding Fungus gnats, take a small portion of the fungus with the maggots inside (seen by first breaking the toadstool) and keep in a closed glass jar on a bed of bulb fibre with a sand bottom. If too large a piece of fungus is taken, the mosture will fill the bottom of the jar and drown the inmates, or the emerging adults will stick to the damp glass sides and thus be spoilt for examination.

Certain Muscidae and Trypetidae hibernate, coming out on warm days to sun themselves. We still need to know what species are involved and, indeed, where they hide themselves.

A large number of Borboridae can be found on animal manure of several species, on rotting vegetable matter and in mice runs and rabbit burrows. Even a few Dolichopodidae such as *Campsicnemus curvipes* will at times be found on small pools. Perhaps the prettiest fly I have taken in December is the tiny *Asteia amoena* with its shiny (as if enamelled) white mouth. This breeds in rotten wood. Try and gather the detritus from a variety of trees, remembering to label each pot

adequately. Several rare flies are known, both abroad as well as in this country, only from specimens bred from rotten trees. There are still hundreds of flies whose life history is quite unknown and it is most likely that several will eventually be found to breed in rotting wood.

L. PARMENTER (895).

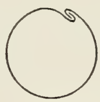
A PRACTICAL PUPARIUM

On page 9 of "Practical Methods and Hints for Lepidopterists"* there is a statement—author anonymous—that "Any fool can make a good breeding-cage". This encourages me to give particulars of a cheap and simple method of storing pupae awaiting emergence, which I have used successfully for many years. Any fool can make it—I made it myself! The dimensions are a matter of individual choice; I give those that I have found most convenient for my own use.

A rough wooden tray is made with *inside* measurements 21″ × 6″ × 3″ deep; its bottom being of $\frac{1}{2}$″ wood, the ends and sides of $\frac{3}{8}$″. The ends, sides and bottom are nailed or screwed together. The end-pieces project $\frac{1}{4}$″ below the bottom, so that the tray is raised that distance above the shelf on which it stands. The floorboard is freely perforated with small holes for drainage.

In this tray stand four cylinders of "meat-safe gauze": that is, wire gauze with square mesh, about 14 to the linear inch. The cylinders are 6″ deep, 4″ in diameter; and are made by cutting a strip of gauze 6″ wide, $13\frac{1}{2}$″ long, rolling it round a 4″ tin, or other circular article of that diameter, bending over the ends as shown in fig. 1, and pinching them together. The cylinder is open at both ends. Each end-piece of the tray has two holes drilled in it, 3″ apart; each hole being $1\frac{1}{2}$″ from the centre, and $\frac{1}{4}$″ above the level of the floor inside the tray. Two wires are passed through the holes in one end-piece, from the outside, threaded through the gauze of the cylinders, and passed out through the holes in the other end-piece. Note that the holes in the end-pieces are only $\frac{1}{4}$″ above the floor, whereas the wire should be threaded through the cylinders $\frac{1}{2}$″ above the floor. When the cylinders have been spaced out 1″ from each end of the tray, and 1″ from each other, the wires are pulled tight and their ends twisted up and cut off. If the job has been neatly done (see fig. 3) the cylinders will be held tightly down against the floor. Earth to the depth of 1″ is then packed into the tray, both inside and outside the cylinders: and this, with the wires, keeps the cylinders firmly in position. On top of the earth I use a mixture of earth two parts and chopped coir one part—again one inch deep. This does not cake, and seems to be most acceptable to pupae. Those pupae that are naturally subterranean have little hollows scraped for them, and are then covered with more of the mixture. If larvae on the point of pupation are introduced into the cylinder, they will of course do this part of the business for themselves. Those spun up in twisted leaves, or cocoons, can either be just laid on the soil, or pinned to the side of the cylinder. The top of the cylinder is covered with mosquito-netting or muslin, kept in place by a rubber band. A label with number referring to the note-book is pinned to the cylinder, outside. Fig. 2 shows the completed unit: fig. 3 shows it in plan.

Fig 1.



Ends of gauze strip bent over before being pinched together.

Fig 2.

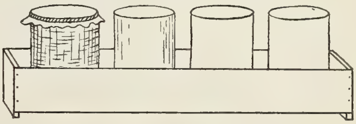
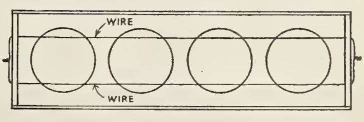


Fig 3.



A battery of these trays, standing on a shelf—one end towards you—will accommodate a large number of pupae in a small space. Different species can be kept separate. Spraying is easy. If a thorough soaking is required, the tray can be stood in a vessel containing water about $1\frac{1}{2}$″ deep, when the earth will soak it up. Moths emerging find a most satisfactory foothold on the wire or muslin.

*The Amateur Entomologist, Volume 9, published by the AES earlier this year.

They can be easily seen since there are no corners or crevices in which they can hide: and for the same reason they can be very easily removed. The whole unit can be made in about half an hour.

A. L. H. TOWNSEND (1691).

INSECT ORDERS

(*Continued from page 100*)

Order X

ANOPLURA (*Lice*)

These are small wingless insects which are estoparasites on birds and mammals, and soon die if removed from their host. Many species are specific to a particular host and sometimes occur in such numbers as to cause the death of the host. One species, the body louse (*Pediculus humanus*) is the carrier of the causative organism of typhus fever, as well as several other fevers. It is probable that from the dawn of history until the recent war when control methods became really efficient, this species has caused more casualties in the world's armies than the actual fighting.

The *Anoplura* can be very sharply divided into two suborders. Some authorities have even divided them into two separate orders, but, apart from the mouth parts (discussed below), both suborders are so similar in structure, habits and life histories that it is almost impossible that two orders could have arisen independently whilst being so similar.

I. **Mallophaga.** The mouthparts are of the biting type and the host is usually a bird, though some species are ectoparasitic on mammals.

Mallophaga live on fragments of skin and feathers; very rarely they take blood. If the parasitisation is heavy the bird will probably start to lose its feathers. The dust baths taken by many birds are to rid themselves of these pests. The life cycle is very simple. The egg is laid glued to a feather and the young nymph, similar except in size to the adult, hatches in a few days. After a few weeks' growth and several moults it becomes adult. Breeding is continuous, since being in contact with a warm-blooded host they are not subjected to external conditions, but live in a constant warm environment. Transmission from host to host takes place by contact of the host species. This explains the specificity of one species of *Mallophaga* to one species of bird, since different birds rarely come into close contact. Also of interest is the fact that closely allied *Mallophaga* parasitise closely allied birds, this suggesting that the parasite has evolved along with its host.

II. **Siphunculata.** The mouthparts are of the piercing and sucking type and the host a mammal. The thoracic segments are fused together. They live exclusively on blood. In this suborder are the human body- and head-lice. The life history is similar to that of the *Mallophaga*. Again we have species specific to a host and allied species to allied hosts. According to Imms, the greater number of species are as yet undescribed; about 200 are known, as opposed to 1700 *Mallophaga*. There are 260 British *Mallophaga* and 26 *Siphunculata*. A further 22 have been recorded from the Zoo.

(*To be continued.*)

BRIAN O. C. GARDINER (225).

AES ADVISORY PANEL

Will members please add to page 82 of *Bulletin No. 127*, under the heading "Hemiptera-Heteroptera," the name of Mr. S. PAUL SIMMONDS, B.Sc. (2009), 49 Iveson Approach, Leeds 6, who will also advise generally on pests of fruit.

REVIEW

Beekeeping and Agricultural Sprays by Beowulf A. Cooper, B.Sc., A.R.C.S., F.R.E.S. 12 pages. Reprint from the Yearbook of the Lincolnshire Beekeepers' Association 1950-51 and obtainable from C. B. Pratt, 1 West Ham Lane, London, E.15. 1s 6d.

Starting with an explanation of the application of sprays, this booklet goes on to give a concise, yet detailed, account of the effect on bees of the numerous types of poisons now used in the field. Mr Cooper closes with some useful advice on the treatment of affected colonies. An invaluable paper to any keen beekeeper.

B. L. J. B.

Printed by T. Buncle & Co. Ltd., Arbroath, and published by the Amateur Entomologists' Society, 1 West Ham Lane. London, E.15. 1951.

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Edited by
W. J. B. CROTCH, M.A., A.K.C.

The Amateur Entomologists' Society
1 West Ham Lane, London, E15

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Compiled by A. BLACKBURN (1715)

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

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AES BULLETIN

No. 133

JANUARY 1952

OUR ORIGINS

Dear Fellow Members,

Greying hair and an increasing sense of remoteness, if nothing else, remind me that many moons have passed since the AES had its birth, and, as your Founder, I have been asked by those now in control of its destinies to write a short account of how that momentous event—much more momentous in the entomological world than I then guessed—came to pass.

From my earliest days I had been interested in insect life and, so far as a rather nomadic existence in my younger years permitted, I joined the ranks of collectors while still at school. The hobby remained with me in later days and in common with all collectors, I suffered the usual vicissitudes of fortune and experienced catastrophes known only too well to us all. My larvae died for no apparent reason, or vanished completely; pupae failed to emerge; the newly-born refused to eat; apparently eligible partners flatly declined to make a match of it, and so forth. For none of these disasters could I find in the then existing text-books any real cause or remedy, and in 1935 I decided that the best way of finding out would be to get in touch with others in similar difficulties and pool our ideas.

That was the original brain-wave from which our now world-wide Society sprang. A modest advertisement for correspondence with amateur collectors brought half a dozen replies; a second roped in about a dozen more; and in about a year we had what we then called a " correspondence club " of some 38 members. I acted as the focal point, being editor, secretary, and printer all rolled into one (for we had a monthly periodical produced on a homely " jelly-pan " with questions and answers, exchanges, and so forth, which was circulated to all concerned).

I had a mild surprise at the outset when I found that instead of the schoolboys whom I expected to be interested, men older and wiser than myself came rolling up! That shook me a bit, but not so much as the fact that they were joined by others whose names were well known in scientific circles, and I quickly realised that my brain-child was rapidly outdistancing its parent, and that the scheme I had started, in all my amateur innocence, required a great deal more both of time and knowledge than I was able to give.

That problem solved itself about 1936 when an unexpected change in my business life made it impossible for me to carry on the good work, and it is at this point that the Society really emerged from the larval stage and, after a very short pupation, burgeoned forth into something like its present form. This is entirely due to the enterprise and energy of two of its members, Messrs. Cooper and Brangham. Not wishing to see the Club (as it then was) perish for want of nourishment, they nobly undertook to carry on in my stead, and from that time forth, in its new guise as the AES my little venture has gone from strength to strength. However long the Society may last and to whatever heights it may soar, those two names should be inscribed in letters of gold on its records.

This in no way diminishes the great credit that is due to the many others who, since that time, have taken a great part in the management and furtherance of the Society's work; but the fact remains that had it not been for the keenness of those two, and particularly, may I say, for the long and arduous Editorship of Mr. Cooper, the Society might well have suffered the fate of so many similar enterprises, and died in infancy. My debt of gratitude to them, and to all the others, can never be told or repaid.

Within two or three years after they took the Society in hand, our membership had increased to 180 or thereabouts and printed *Bulletins* began to make their appearance, taking the place of the more primitive sheets of duplicated material. The

rapidly increasing membership then demanded some form of specialisation, and our now well-known leaflets on various individual aspects of entomology, with their host of valuable hints to the amateur, came into being. Between these and the present splendidly produced *Handbooks* and other literature there were many stages, each going one better than its predecessor, with the result that our Society now produces an encyclopaedic mine of information, second to none, much of which is not to be found, so far as I know, in any of the normal text-books on entomological subjects.

Not the least valuable of the Society's activities is its exchange section, whereby members in widely separated localities are able to get into touch with each other and to fill gaps, both in their cabinets and their apparatus, etc., which otherwise might present considerable difficulty. This is particularly the case in regard to collections of tropical and other exotic insects.

There is no need for me to enlarge on the present status of the Society in the entomological world. It stands high in the ranks of national scientific societies; its members range far and wide over the British Commonwealth and many other lands across the seas; well over a thousand collectors have joined its company, among them men of world-wide reputation, and, in short, it has become a powerful bastion in the realm of entomological research.

As with all enterprises which are of strong and rapid growth, there is a danger that this very fact may prove a hindrance inasmuch as the edifice may become cumbersome and top-heavy, with the result that the burden of central administration becomes greater than can be comfortably supported by its officials. While I do not suggest that this is the case with our Society, there is no doubt that those responsible for keeping the wheels running are finding it increasingly difficult, as witness the occasional appeals for more helpers which appear from time to time in the *Bulletin*. I do not intend to take advantage of this article to reiterate my former suggestions for easing the burden in any detail, but I should like to mention that, in my view, the only real palliative is decentralisation, and the splitting up of the work into some kind of regional formation, with sub-committees and district secretaries. But, as I say, I do not wish to labour that point here. It has already been aired enough!

For myself, the burden of years, combined with the exacting demands of my work as School Bursar-cum-Housemaster makes it well nigh impossible for me to devote much time to what remains my ultimate interest — entomology. Nevertheless, this by no means implies that I am not mindful of the Society and its activities, and, this being so, may I close this account of its progress with an expression of the hope that come what may, those at the helm will never lose sight of the main object for which I founded it, namely, the well-being and interests of the *young amateur collector*. It was he that I had in mind in 1935, it is he that has first place in my thoughts, and if—as I am sure will be the case—the Society continues to serve him as magnificently in the years to come as it has done hitherto, then at least I can feel that in my time on earth I shall have contributed something to the world of youth and to the science of entomology. I shall also be able to say, in company with a far greater man, " Si monumentum requiris, circumspice!"

To you all I say " God-speed and good hunting!" May the Society collectively and you individually have the best of good fortune in the years that follow.

Yours sincerely,

L. R. Tesch (Founder).

EX CATHEDRA

Our Founder, in his history of the Society, leaves very little for me to add, but as I have had the honour of being elected your President, it is my duty to make a contribution to these pages.

Some time ago Mr. Tesch suggested that the AES be split into regional groups with their own secretaries and sub-committees. The Council spent some considerable time in discussing this suggestion and came to the conclusion that administration would be too difficult under this system. The smooth running of the AES to-day is a result of team-work with all members of the team in close contact and to spread the work farther afield would mean loss of efficiency.

We have, in fact, attempted to group ourselves by subject rather than by region, for the formation of Study Groups is one of the outstanding developments of the past year. An initial progress report appears in this issue, but it is as yet too early to assess their true value. We need more experts who will call for amateur observation on some interesting points.

Last year Mr. Crotch appealed to each member to introduce at least one new one to help offset the rising cost of publications. Mr. D. F. Smith (1755*) is to be congratulated on having five new members to his credit; and all the following have brought in more than one each:— Miss Burrage (1703), Dr. Hill (1043), and Messrs. Broughton (1632), Bushby (1075), Crotch (1181), Johnson (1040), Moppett (1841), Newman (503), Parrett (1991), Rivers (1443), Russell (1525), Shaw (545), Stidson (40), Trought (1373), and Watson (752). The total response was, however, not large enough to get us out of our financial difficulties. We were already running at a small loss before the disappearance of the penny post lopped off sixpence from the value of every subscription. The future of the AES is, as always, in the hands of the members, who in turn put their trust in the Council they elect. We have made every possible economy, but cannot avoid an increase of subscription this year—to twelve shillings for senior members and six shillings for junior members. I am sure that members will support this move, which will, after all, cost them only an extra ha'penny (or farthing) a week. An inflow of donations, too, would relieve the Council of a lot of anxiety.

To members at home and overseas I would like to wish a Happy New Year and may you all get much pleasure and interest from your hobby.

B. L. J. Byerley (788).

NEWS FROM JORDAN

Mr. Trevor Trought, till recently our Editor, writes:—

" Air-travel has some advantages, but one cannot take much kit, so entomological equipment is liable to be squeezed out. Thanks to my good friend, Renfrew (1507), who gave me some of his balsa wood setting boards, my net and a box of mixed pins, I was able to start in a small way, but my hope of getting other apparatus out here was frustrated. Plaster of Paris and potassium cyanide were very difficult, a suitable bottle for a killing bottle almost more difficult to get. Moreover, a new and full-time job of work left little time for the pursuit of a hobby. There was nothing to do but go slowly at first. I am beginning to look forward to a somewhat more expanded range of activity. People are getting to know that I am interested in ' dooda,' as larvae are called, and bring me both caterpillars and imagines.

During the summer, butterflies are the main interest. While I have seen or caught about half the butterflies recorded (by Graves and later by Hemming), I have seen only about a couple of dozen species of moth, including ' micros.' Admittedly, I have been living in a town; but the summer is really the dead season. During the Spring, on the hills round Amman there are thousands of larvae of the *Lasiocampidae*, *Lithosiidae* and *Arctiidae*. These are all known under the general heading of " Spring Worms."

The split between Israel and Jordan had the unfortunate effect that the scientific collections of both plants and insects went to Israel, so that there is all to do in Jordan now, in both respects. In some ways, Jordan is a land of contrasts. Early on I came to the conclusion that the butterflies were somewhat solitary creatures. When one got out of the car to make a swipe at a butterfly (and generally missed it, of course) nothing further happened for ten or more minutes—and one couldn't wait those ten minutes. Later, round one small bush, I caught ten Lycaenids in two sweeps of the net. In one garden in the Ghor, I saw more Monarch butterflies flying round a patch of Zinnias than have been seen in England in half a century. I stopped on the road near the Allenby Bridge one morning, quite convinced that I had run into a migration of a Pierid butterfly. Three or four days later, I was there again, and so were the butterflies.

There are some difficulties of technique which are giving me trouble. This is one of the driest of climates, in the summer at any rate. It is also very hot in the Jordan Valley.

An insect is killed much more quickly in a cyanide bottle than at home and also stiffens up much more quickly. So what it amounts to is that you have to carry a relaxing tin with you in the field and transfer your specimens to it every so often. Leaving an insect in the type of relaxing tin described briefly by Mr. Townsend (1691) in *Bulletin 128*, p. 90, is all right for two or maybe three days. But even though the atmosphere in the tin is so obviously damp, a moth's legs and wings get remarkably brittle, defying setting. Nevertheless, for twenty-four hours, it is good. I had to change the formula slightly, using deal sawdust and thymol, instead of cedarwood and creosote. Bnt I doubt if that would make all the difference—or would it?

Lack of knowledge of the foodplants or their possible substitutes has naturally been a very great handicap in larva rearing. Apart from that, tins do not seem suitable containers for caterpillars, unless one can be sure of keeping them cool. This can't be done in the Jordan Valley in the summer, but I took some time to learn this. After one had left everything apparently quite all right, with the tins in the shade, when one returned the caterpillars were cooked because the driver had decided to turn the car round! I think that cardboard collecting boxes for caterpillars are the only thing.

May I wish a prosperous New Year to all the members who remember me?"

YOUR LIBRARY

In these days, with the cost of books rising, it is wise to obtain such of the Government publications as are available that relate to our interests. They are well produced and give information not found in every textbook: moreover in the case for example of the flies, there are illustrations not available elsewhere. They are cheap and in many cases are free. A catalogue (free) can be obtained from H.M. Stationery Office, Kingsway, London. Ask for Sectional List No. 1, Ministry of Agriculture and Fisheries, Agricultural Publications.

Incidentally, in Advisory Leaflet 365 Houseflies, the illustrations of Bluebottle and House fly bear the wrong titles. That labelled House fly is a Bluebottle (*Calliphora* sp.) and that labelled Bluebottle is the common House fly (*Musca domestica*).

L. Parmenter.

STUDY GROUP PROGRESS

As indicated in the report of the AES Exhibition (*Bulletin No. 132*, p. 117) two study groups have got well under way. The most active is undoubtedly the Silk Moth Group, whose Hon. Sec. (Mr W. R. Smith, 1641) reports nearly a score of members. The aim of the Group is generally to improve the " knowhow " about rearing Silk Moths in this country and they have embarked upon a study of the relatively unknown early stadia of such African Saturniidae as can be obtained. One of the members (Mr. C. Hosking, 2022) has made a series of photographic studies. Two of his photographs of *Nudaurelia tyrrhea* received the honour of being hung by the Central Association of Photographic Societies. All the data collected and photographs taken will be placed at the disposal of the Editor when the new edition of the Silk Moth Rearer's Handbook can be financed by the Society. The members of the Group are exchanging ideas and assisting novices by personal meetings and by correspondence. The majority, though living as far from London as Cheshire and Berkshire, met together for lunch on the day of the Exhibition.

The Orthoptera Group is making studies of life-histories and distribution and has achieved a sense of corporate existence.

The Weevil Group and the Insect Galls Group report some activity by correspondence, but have not yet developed central themes for study.

Mr. J. H. Johnson (1040) has been disappointed by the response to his appeal for joint study of the Elephant Hawk moths. He invites any AES member who took *D. elpenor* larvae last year to let him have the date and size when found and, if possible, their colours when fully grown.

Will members, and particularly Schools, look again at p. 82 of the Membership List (*Bulletin No. 127*) and see whether they can assist in any of the special studies indicated in the list of groups.

COLLECTING CENTIPEDES AND MILLIPEDES

(*The AES Council is indebted to Dr. J. L. Cloudsley-Thompson, M.A., Ph.D. (Cantab.), F.L.S., King's College London, for the specially-written article which follows.*)

Although every naturalist must be familiar with the general appearance of centipedes and millipedes, very few have attempted to make closer acquaintance with these unusual arthropods. The reason for this neglect is not hard to find. With the exception of *Blaniulus guttulatus*, the "Spotted-snake millipede," and one or two other species which occasionally attack agricultural crops, they have little economic importance. They are not at all easy to identify, and the literature about the group is scattered and often inaccessible. However, this difficulty of identification is not insuperable, and, once the plunge has been taken, it will be found that there is ample scope and opportunity for the amateur entomologist to make valuable contributions to our knowledge of these interesting little creatures. In this short article, a number of references are given which should be of value to anyone seriously contemplating the study of myriapods. Where there is no indication to the contrary, these works are by the present writer.

Centipedes (Chilopoda) and millipedes (Diplopoda) are usually grouped together with the microscopic Symphyla and Pauropoda in an unnatural assembly, the "Myriapoda." Despite a superficial similarity between centipedes and millipedes, the morphological differences between them are so marked that they are now regarded as separate classes in which parallel evolution has taken place. For example, Chilopoda have flattened bodies, 15 or more body segments each bearing 1 pair of appendages, long multi-segmental antennae, poison claws, and reproductive organs with a duct that opens at the posterior end of the body. On the other hand, Diplopoda have bodies which are cylindrical in cross-section, 11 or more body segments with 2 pairs of legs to each, club-shaped antennae of 7 or 8 segments, and generative glands with ducts opening on the third body segment. For this reason they are sometimes known as Progoneata. Centipedes are active, carnivorous animals feeding on insects and their larvae, spiders and other small animals which they kill with their poison-claws (maxillipeds). They are usually regarded as beneficial, since they must destroy numbers of injurious insects (Brade-Birks, S. G., 1929. *J. S.-E. Agric. Coll. Wye*, No. 26, 178). Millipedes are sluggish creatures with a vegetarian diet, although some species are occasionally found feeding on decaying carcases (Brade-Birks, S. G., 1930, *Ibid.*, No. 27, 103: Evans, T. J., 1910, *Ann. Mag. Nat. Hist.* (8), **6**, 284: Brolemann, H. W., 1920, *Bull. Soc. Zool. agric.*, **19**, 8). I have found *Blaniulus* feeding on dead snails (1950, *Country-Side* (N.S.), **15**, 270), and they have also been recorded eating worms, molluscs, insects, a slow-worm and a mouse.

The British myriapods are quite harmless; but tropical centipedes may reach a foot in length and their poison can be dangerous even to man. Both centipedes and millipedes are distasteful to their enemies (*Naturalist*, **1949**, 137), the latter on account of a repugnatorial, poisonous fluid secreted by a row of glands opening along the side of the body. The fluid of some of the tropical species has a strong caustic action on the human skin and is dangerous to the eyes. The subject has been reviewed by E. Burtt (1947, *Trop. Dis. Bull.*, **44**, 7).

Myriapods are nocturnal animals, and during the daytime are usually to be found in damp, dark places (1945, *Nature*, **156**, 537; 1950, *Quart. J. Micr. Sci.*, **91**, 453; 1951, *Proc. Zool. Soc. Lond.*, **121**, 253). Diurnal rhythms in millipedes have recently been investigated experimentally (1951, *J. Exp. Biol.*, **28**, 165). These facts determine the best places in which to collect: under leaves, bark and stones, in the soil, in accumulations of rubble and humus, and so on. In addition, some centipedes are marine and have been found living among sea-weed below high-tide mark. Little is known of the physiology of these animals, which are apparently very rare (*Naturalist*, **1948**, 149)—they are well worth looking for on a summer holiday.

The larger species of myriapods are best collected with a pair of forceps, smaller species by means of a camel-hair brush. A screw-driver is most useful for levering up bark, while dead leaves, etc., should be shaken over newspaper, or sieved. Similar methods are used for collecting spiders (1951, *Country-Side*

(N.S.), **16**, 111; Locket, G. H., and Millidge, A. F., 1951, *British Spiders*, **1**, Ray Soc. London). Spirit preservation is normally essential. Labels should be written with waterproof Indian ink and placed with the specimen in a tube. (Paper stuck on the outside is liable to come off.) The tubes can then be corked and put away in a cupboard. As the collection grows, it will be found necessary to keep the tubes plugged with cotton-wool, in stoppered bottles containing 70% alcohol, so that there is no risk of the contents evaporating and ruining the specimens. It is a great mistake, however, to pop every specimen into alcohol the moment it is caught. Much interesting and useful information concerning food, behaviour, mating habits, and so on, can be obtained by keeping the animals alive in a dish containing moist humus, moss, and pieces of bark (1950, *Country-Side* (N.S.), **15**, 200; 1951, *Proc. Zool. Soc. Lond.*, **121**, 253). I know of a *Lithobius forficatus* which lived in a glass jar for four years and seven months, and then only died as a result of an accident!

As one collects, any biological and ecological observations such as migrations (1949, *Ann. Mag. Nat. Hist.* (12), **2**, 947), enemies (*loc. cit.*), food preferences (*loc. cit.* and Lyford, W. H., Jr., 1943, *Ecology*, **24**, 252), breeding seasons (Auerbach, S. I., 1951, *Ecol. Monogr.*, **21**, 97; Causey, N. B., 1943, *Amer. Midl. Nat.*, **29**, 670) and so on, should be noted. At present there is very little information on these matters or on distribution. See 1951, *Ent. mon. Mag.*, **87**, 247; *Zoo Life*, **6**, 92; *Discovery* (in the press); *Science News*, **23** (in the press) for general accounts of the biology of myriapods; also Sinclair, F. G., 1895, "Myriapoda" in *The Cambridge Natural History*, **5**, 27.

IDENTIFICATION.

The more important Families of centipedes and millipedes found in the British Isles can be separated by means of the following key:—

'Myriapoda.'

12 body segments, 9 pairs of legs. Less than 1 mm. long ... PAUROPODA.
12 body segments, 12 pairs of legs. 3-6 mm. long .... SYMPHYLA.
11 or more body segments, 2 pairs of legs to each .... DIPLOPODA.
15 or more body segments, 1 pair of legs to each .... CHILOPODA.

Class Chilopoda (Centipedes).

14 body segments .... Lithobiidae.
22 body segments .... Cryptopsidae.
31-173 body segments .... Geophilidae, Schendylidae, Mecistocephalidae, and Himantariidae.

Class Diplopoda (Millipedes).

1. 13 pairs of legs, body covered with bristles. 2-3 mm. long .... (sub-class Pselaphognatha). Polyxenidae.
   17 or more pairs of legs, larger .... (sub-class Chilognatha) .... (2).
2. 17 pairs of legs, body short and broad, woodlouse-like .... Glomeridae.
   Numerous pairs of legs, body elongated .... (3).
3. Body convex above, flattened ventrally .... Polyzoniidae.
   Body circular, or more or less flattened dorsally .... (4).
4. Body more or less flattened dorsally .... (7).
   Body circular in section .... (5).
5. 28 body segments, under 10 mm. long .... Chordeumidae.
   30 or more body segments .... (6).
6. Body stouter .... Iulidae.
   Body more slender .... Blaniulidae
7. 19-20 body segments .... Polydesmidae.
   30 body segments .... (8).
8. Body under 10 mm. long .... Brachychaeteumidae.
   Body more than 10 mm. long .... Craspedosomidae.

For the determination of some species, minute structural characters must be examined: the copulatory appendages of male Diplopoda, the spines on the legs, the mouth parts and pore fields of Chilopoda. It is not yet possible to identify many of the female Diplopoda.

Keys for the approximate identification of the British fauna are given by S. G. Brade-Birks (*loc. cit.*), and F. A. Turk (*North West. Nat.*, **1945**, 137; **1947**,

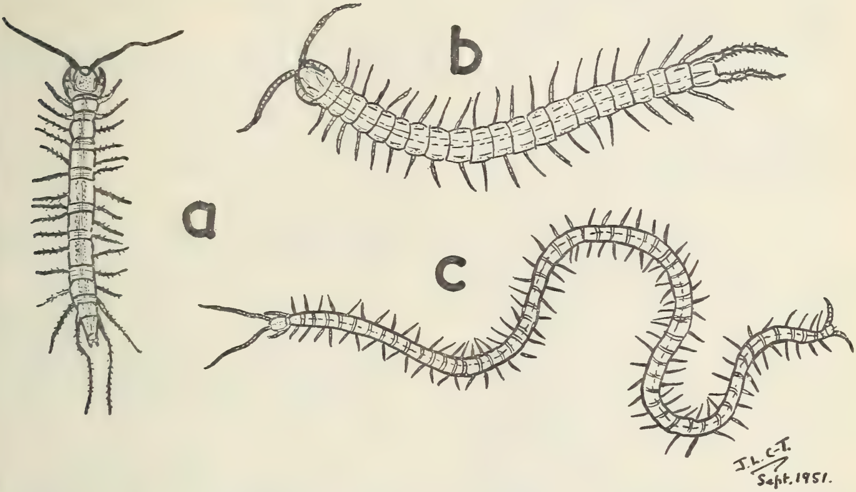

Fig. 1. Examples of Centipede (Chilopoda) Families. a. Lithobiidae. b. Cryptopsidae. c. Geophilidae. (*Drawings not to scale.*)

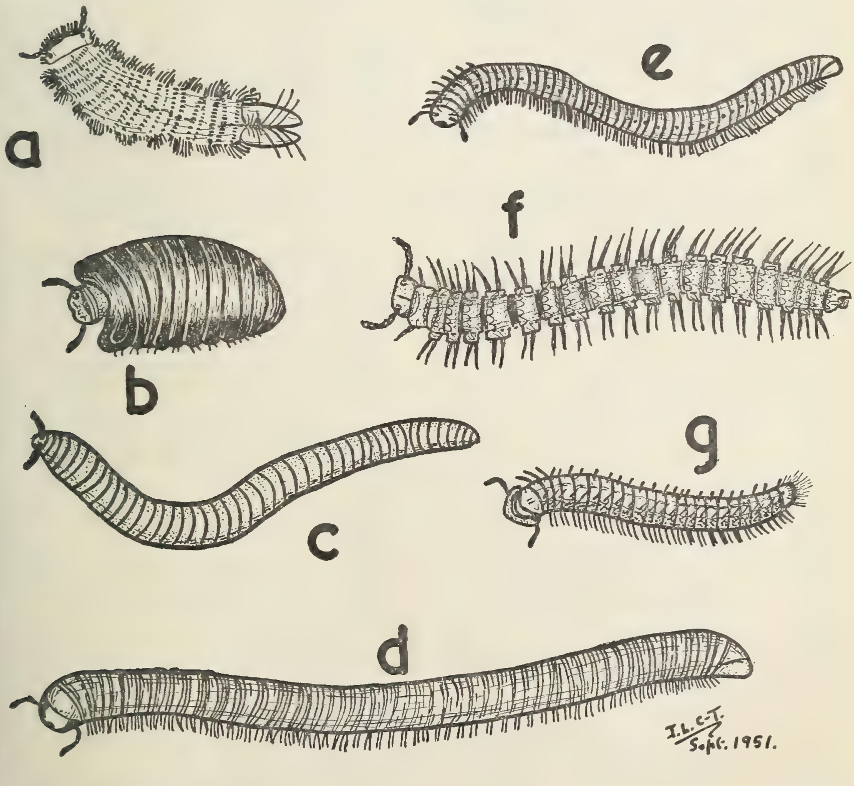

Fig. 2. Examples of Millipede (Diplopoda) Families. a. Polyxenidae. b. Glomeridae. c. Polyzoniidae. d. Iulidae. e. Blaniulidae. f. Polydesmidae. g. Craspedosomidae. (*Drawings not to scale.*)

226). For the certain identification of rarer forms, reference must be made to one of the following:

Brade-Birks, S. G. (1939). Notes on Myriapoda, XXXVI. Sources for description and illustration of the British Fauna. *J. S.-E. Agric. Coll. Wye*, No. 44, 156.

Brolemann, H. W. (1930), Chilopodes. *Faune de France*, **25**, Paris.

—— (1935), Diplopodes I, *Faune de France*, **29**, Paris.

Schubart, O. (1934), Tausendfüssler oder Myriapoda I: Diplopoda. *Tierw. Deutsch.*, **28**, Jena.

LET US BE ACCURATE

In a recent contribution to the *Bulletin* the cubic centimetre is used as the term of description of a thousandth of a litre. This is incorrect. A thousandth of a litre is a millilitre and the cubic centimetre should never be used as an alternative for the millilitre. All modern measuring vessels are graduated in millilitres and not in cubic centimetres.

When the International System of Weights and Measures was introduced in 1799 the litre was defined as the volume of a cubic decimetre and the cubic centimetre was then quite properly used as the thousandth of a litre. At the same time the kilogram was defined as the weight of a cubic decimetre (litre) of water. Later it came to be realised that masses could be compared with a higher degree of accuracy than volumes could be determined; and the original definition of the kilogram was abandoned, because doubt had arisen whether the original kilogram did conform precisely with that definition. It was obviously preferable to have a material standard of mass specifically defined, rather than one defined from the unit of length through the unit of volume. Accordingly in 1889 a new kilogram, called the prototype kilogram, was constructed as nearly as possible equal to the original kilogram and this is at present the standard kilogram. This kilogram is a completely independent standard entirely unrelated to the cubic decimetre or litre. In 1902 the litre was redefined as the volume of a kilogram of water and consequently the thousandth part of a litre is now the millilitre and not the cubic centimetre with which it has no derivative relationship. In brief the original litre was the volume of a cubic decimetre and the kilogram was the weight of a cubic decimetre (litre) of water. A new kilogram was then constructed, independent of any considerations other than mass, and the litre was redefined as the volume of water which weighs one kilogram.

J. M. HAMILL (2010).

(Dr. Hamill has given a fuller account of this subject in an article entitled "The International System of Weights and Measures," *Brit. Med. Journal*, 5th April 1947, p. 460. —ED.)

MATING IN ROVE BEETLES

On 31.5.51, whilst working on the school allotments, a juvenile coleopterist, Jack Brow, took a pair of *Gyrohypnus punctulatus* Goerz. *in cop.* from turf. These were still together fifteen minutes later when again examined in a tube. This adds confirmation to the record of Mr. Last in *AES Bulletin* for April 1951. I am indebted to Mr. W. O. Steel for identifying the specimens.

W. J. SANDERS (1172),
Coldcotes Beetle Club.

REVIEW

The British Amphibians and Reptiles by Malcolm Smith; pp. 318, 18 colour plates, 33 half-tone plates and many figures. The New Naturalist Series, No. 20. Collins, London; 1951; 21/-.

One is constantly being amazed by revelations of the subtleties of the balance of nature. Newly-hatched Newt tadpoles are the prey of dragonfly nymphs and water beetles; but it is not long before the survivors are big enough to wreak vengeance by becoming the predators on these same insect species. Readers of this book (which is fully up to the highest standards we have learned to expect from the series) will find a good deal of information about the inter-relations of the British amphibians and reptiles with the insects. It is an obvious choice for members with Christmas Book Tokens to exchange: the only danger seems to be that too many entomologists may turn to herpetology and keep reptile pets at the expense of their insects!

W. J. B. C.

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EDITED by W. J. B. CROTCH M.A., A.K.C.

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BUMBLE BEES (1)

Probably the main reason why so few amateurs are interested in the Bumble Bees is the relative inaccessibility of literature on the group. In order to take an active interest in any group of animals, it is a primary necessity to be able to identify the individual species. The Bumble Bees constitute a group of handsome insects which not only make a very good show in a collection but which, in life, have very interesting habits. There is ample opportunity for collecting them and for studying their habits and distribution.

This is the first of a series of notes which will appear in the *Bulletin*. My intention is to give the beginner an outline of the life histories of this group and a means of identifying them. Fortunately, the colour characteristics of most of the British species are fairly constant and specific. They have, therefore, enabled me to give a simple description of most of the British species in relation to their colouring and, to end with, a key to simplify identification. Methods of collecting and more advanced systems of classification will also be mentioned. It is my hope that more members, especially the junior members, may be stimulated to study this fascinating group.

The family *Bombidae* contains the two British genera, *Bombus* and *Psithyrus*. *Psithyri* are parasites on certain members of the genus *Bombus*, and, because naturalists did not distinguish the two genera for a long time, the members of the genus *Psithyrus* were not given popular English names. The names which I shall give are taken from the Latin names and are intended to help beginners.

The Castes

There are three castes: queens, males and workers. Workers as well as queens are females. Workers differ from queens in their smaller size and inability to lay fertile eggs, although sometimes they may lay unfertilized eggs, which become males. The queens are the normal functional females and the workers are specialized to spend their lives foraging for food and tending the nest.

The males differ from the females in having a greater number of visible segments in the abdomen, which ends in a flat tip; longer antennae; and slightly larger eyes. They often appear to be more yellow than queens and workers of the same species. The males are smaller than the queens, and usually the same size or a little larger than the average workers. The males have no sting.

Six major differences between Males and Females are given in the lists below.

Male

Abdomen has seven visible segments.
Antennae have thirteen segments.
Legs are thinner.
Armature present, sting absent.
Eyes are larger.
Flat tip to abdomen.

Female

Abdomen has six visible segments.
Antennae have twelve segments.
Legs are thicker.
Armature absent, sting present.
Eyes a little smaller.
Pointed tip to abdomen.

Life Histories

(i) *Bombus*.

In Spring the fertile female, or queen, awakes from hibernation and, after feeding herself from the early Spring flowers on warm sunny days, searches for a nesting site. The type of site selected depends on the species, but there are two groups: the larger group usually nest underground, often in disused mouse-holes; and the smaller group, the Carder Bees, nest on the surface of the ground, under a dome of moss or grass clippings "carded" into place.

Once the nest is built, the queen makes a waxen cell, containing pollen and honey mixed together, on which she has laid a number of eggs. The eggs are incubated and the legless larvae hatch out. Fresh supplies of food are given to them, when needed, by the queen. The larvae pupate and the adult workers hatch out about three weeks after the eggs were laid.

The workers are smaller than the queen, and are normally sterile. They care for the brood and, gradually, as their numbers increase, take over all the duties of the nest from their mother.

When a suitable number of workers have hatched out, the queen begins to lay unfertilized eggs which become males, and, later, fertilized eggs which become queens. As soon as they are able to fly, the males leave the nest and feed themselves at the flowers. They do not return to the nest. When the young queens are ready to fly they leave the nest and mate. After mating, the queens soon seek out winter quarters in which to hibernate. The old queen and workers die and the nest is disbanded at the onset of autumn. The males also die at the end of the summer. The young queens alone live through the winter to start the cycle again the following spring.

(ii) *Psithyrus*.

The female *Psithyrus* awakes from her winter hibernation later than her *Bombus* cousin. She then seeks out a nest of her particular host species of *Bombus* and crawls in unnoticed. When she is ready to lay, she kills the *Bombus* queen by stinging her to death and lays her own eggs, which the host workers tend as if they were those of their own queen. The *Psithyrus* eggs become either males or queens, and these leave the nest to mate. The males die at the onset of Winter, and the queens hibernate and carry on the race next Spring.

The success of the parasitism depends upon the size of the *Bombus* nest, because if this is too big in numbers, the workers may kill the *Psithyrus* female. It also depends on the loyalty of the *Bombus* workers to the brood, rather than to the queen. *B. lapidarius* suffers a great deal from parasitism by *Ps. rupestris* and the *Bombus* workers seem to show distinct antagonism to any queen when she commences to lay male and female eggs, even if it be their own.

(*To be continued*)

T. B. Poole (1681).

OPERATION 'SWALLOWTAIL'

" That most temperamental of all butterflies " (Mr. L. Hugh Newman).

The successful mating and breeding of the Swallowtail butterfly (*P. machaon*) was carried out in August 1951 in a small greenhouse in Cheshire. The writer is grateful to Mr. L. Hugh Newman for advice on the subject.

The greenhouse. Size 10′ × 6′. Roof fitted with three small blinds which could be pulled down on either side to prevent excessive heat. For improved ventilation on very hot days a wooden frame fitted with a wire mesh could be slotted into the entrance instead of the sliding door.

Foodplant. Fennel seedlings were planted in earth which extended all along one side of the greenhouse. The fennel throve, growing to a height of over 4′. For the butterflies fresh flowers (lupin, catmint, marigolds and foxgloves) were supplied on alternate days. These and the fennel were liberally sprayed with water two or three times a day in the hot weather. On this régime the butterflies lived almost exactly one month. No extra sugar and water appeared necessary.

Mating. Eight butterflies emerged during the period June 13th-22nd and mating between three couples was witnessed. The time of day of this was variable, 1.5 p.m., 3.30 p.m., and the last as late as 7.30 p.m. B.S.T. The temperature at this time of mating was about 75° F. and the atmosphere moist. The couples remained together for a variable time, 35 minutes to 95 minutes.

On no occasion was true ' calling ' witnessed and mating appeared to be encouraged by bringing the males near the females. The former would then circle round and finally copulate with the female to whom he had been introduced.

Egg laying. This did not take place at once but began one to two days after mating and each female laid about 50 eggs—most of these were fertile and hatched in about 12 days. Streaks of brown appearing on the surface of the egg were the first indication of fertility.

The larvae. These throve on the fennel and those that were left in the greenhouse did better than those transferred indoors. Temperatures up to 100° F. did not appear to worry them and once this had been established the blinds were only infrequently drawn.

Pupae. When fully grown about half the larvae were transferred indoors and the other half allowed to pupate in the greenhouse. The caterpillars were very active before pupation and care had to be taken to avoid treading on them in the greenhouse. They have spun up in various nooks and crannies, but in general appear to have avoided the foodplant, except in two instances.

No summer brood emerged; but the June imagines were very late and this is the probable explanation.

C. A. CLARKE (1569).

NOMENCLATURE AGAIN

Mr. R. H. BENSON (1444) writes: " Having already ventilated my ignorance of Latin nomenclature of Lepidoptera (*Bulletin, Vol. 10, No. 113*) I am wondering whether my latest difficulty would be of general interest and, if so, whether it can be answered by someone with knowledge.

"In Volume 2, No. 2, of the 'Entomologist's Gazette' it is stated that a Classey-Robinson expedition to Ireland ' took a short series of *Aspidates gilvaria* (Straw Belle) which differ so much from the typical form that they constitute a good sub-species.' Having been taken in the Burren of Clare, W. Ireland, it is later referred to as '*A. gilvaria* F. ssp. *burrenensis* Cockayne ssp. nov.'

" This confirms my previous supposition, again in all ignorance, that so-called 'Latin' nomenclature is in many cases merely latinization. What I now wish to know is (A) what supreme entomological body accepts and standardises such a suggested new name: (B) why ' *burrenensis* ' when a similar form might be found elsewhere; and (C) are there any existing Latin-English nomenclatural dictionaries which give the *meanings* of Latin names of insects already in use.

"I should also like to know whether a variation in colouring of a specimen is sufficient to warrant its being named as a sub-species; how does one decide upon the degree of colour difference which warrants it; and ought it not to depend rather upon some variation in structure as compared with the usual form?"

The Rev. Professor L. W. GRENSTED of Oxford has kindly provided the following comment:—

Mr. Benson is, of course, perfectly right in supposing that many generic and trivial names used in zoological nomenclature are what he calls ' Latinizations.' That is because the language of taxonomy is what may be called neo-Latin, a language conforming in grammar and formation to the rules of classical Latin, but needing many more terms than classical Latin can supply. Thus *burrenensis* is properly formed from Burren, and adds a new and convenient adjective specifying a particular section within the total population of moths covered by the specific name *Crocota gilvaria* Huebner. Mr. Benson will notice that I must write *Crocota* and not *Aspidates*. That is because the name *Crocota* was given by Huebner in 1823, while *Aspidates* only goes back to 1825, when it was invented by Treitschke.

But why do I say that I *must* write *Crocota?* That is because there is an International Congress of Zoology, which has met thirteen times since 1889, the last meeting being in Paris in 1948. This Congress adopted an International Code of Zoological Nomenclature, which has been amended from time to time, and which lays down the principles upon which specific and other nomenclature should proceed. In 1901 an International Commission for Zoological Nomenclature was set up, as a standing body to deal with all questions arising under the Code. It is one of the essential principles of this Code that an earlier name, validly assigned to a known and defined insect, takes precedence of all later names. I am, therefore, bound, if I wish to be loyal to the Code, to write *Crocota* in the particular instance cited.

I need hardly add that all sorts of difficulties arise when the attempt is made to apply the Rules of the Code strictly. That is not here the point. It is an essential step towards uniformity in nomenclature that the Rules should be followed as closely as possible. Where doubt remains the International Commission is prepared to determine the doubt by issuing an " opinion," which zoologists may follow (for there is, of course, no compulsion)

and are most certainly foolish if they refuse to do so.

Mr. Benson should notice that the Commission does not give, or, in the first instance, accept or standardise the proposed name. The Rules give much valuable advice as to the formation of these names, but it is left entirely to the individual zoologist to invent them and to establish them by proper publication. That, in the case of a new species, includes a full description, and the naming of a particular known specimen as the type. Then, so long as the trivial name has not been used before within that genus, the name, under the Rules, is valid.

The question of sub-species is not completely settled under the Rules, but in general the above principles apply. There must be publication, a full description, and, properly speaking, a type specimen. But Mr. Benson's question as to what constitutes a sub-species is not easy to answer. After all, species and sub-species are only convenient ways of dividing populations into manageable groups. Probably the simplest answer is that a species or a sub-species is that which is so defined by a competent authority in that particular field. A colour difference would normally be enough to establish a variety, but might in some cases establish a sub-species, if strongly marked and breeding true.

The other points can be dealt with in a sentence or two. There is no Latin-English dictionary for scientific names, and the meaning of many of them is quite obscure. My friend Mr. M. E. Mosely, when naming Mexican caddis-flies, used to take old Aztec words and mix the letters up so as to form queer trivial names which nobody could possibly have used before. But under the Rules they are perfectly valid. And *burrenensis* is an admirable name for the same reason that it is most unlikely ever to have been used before. It does not in the least matter whether that form of the Straw Belle will turn up elsewhere. All that matters is that it has now got a name of its own (assuming that publication has been accompanied by proper description) and that we can henceforward talk about it and know what insect we mean by the name we use. If Mr. Benson is fortunate enough to discover a new species of *Crocota* I am sure that we shall all be happy to know it as *C. bensoni*, without worrying about the possibility that other collectors may sooner or later capture it again.

[Note : — *Particulars about the Code and Opinions can be obtained from the International Trust for Zoological Nomenclature, Publications Office, 41 Queen's Gate, London, S.W.7.*]

DURHAM MOSQUITOES

Two members of the Sixth Form at Houghton-le-Spring Grammar School have begun collecting blood-sucking flies and Diptera with aquatic larvae, instead of the better-known orders chosen by others.

Previously *Anopheles maculipennis* was the only Anopheline reported from Durham county. This was soon caught within three hundred yards of the school. Although local breeding has not been discovered yet, larvae of both *A. claviger* and *A. maculipennis* have been found at three sites between four and ten miles from the school. Adults were reared. Then adult clear-winged Anophelines were caught at Castle Eden. The brightness of the white scales led us to make an immediate search for rot holes in trees in the vicinity. Larvae of *A. plumbeus* were found in very dark-brown water collected in a Sycamore rot hole.

Information is being collected concerning the Culicines. In Teesmouth *Aedes detritus* was observed one afternoon biting man and cows. Numerous larvae were found in the saline waters there.

G. F. W. Hart (1882†),
The Field Club.

Comment.—This is an excellent start. *Anopheles claviger*, *A. plumbeus* and *Aedes detritus* have not previously been found in Co. Durham. A careful search of the suitable habitats should provide a list of the species breeding in this county which has not yet been studied for its mosquito fauna. It would be interesting to compare the habits of the Durham mosquitoes with those already known for southern blood-sucking gnats. Can these new students report on the tree preference shown by *A. plumbeus*? For, so far as is known at present, Sycamore appears to be preferred. The males of this species are said to swarm in

parties of 4-5; can any further details be added? The salt marshes should produce other species than *detritus* and it would be useful to know what is the factor controlling their distribution. How far inland do they extend? In the south I find *A. caspius* far from the sea, on sewage farms. Further study suggestions will be obtained from J. F. Marshall's *The British Mosquitoes* published by the British Museum, Natural History, London, at 20/-.

L. PARMENTER (895).

LETTERS TO THE EDITOR

Dear Sir,—Mr. Eric Parker enquired (*Bulletin, Vol. 10, No. 130,* p. 105) about *S. pinastri* in Surrey. I have never taken the species in that county myself, but a friend tells me that it is quite plentiful in the Camberley area. Incidentally, I have three pupae from Hampshire stock which are apparently sound and healthy, though lying over for a third winter. Three specimens emerged last year after having spent two winters in the pupal state.

Does any member have any facts or statistics about the extent to which butterfly chrysalids tend to "lie over"? I cannot recall having seen any information on this point. I have two chrysalids of the Green-veined White (*P. napi*), from Scottish stock, which did not emerge last year "according to plan," but which appear to be still alive and healthy.

Referring to Mr. R. E. Parsons' article on "Fading of Green Insects" (*ibid.*, p. 107), I can state from my own experience that the vapour of formalin rapidly destroys the colour of *H. papilionaria*, the Large Emerald Moth. Formalin is very effective for the cure and prevention of mould, if a few drops are placed on cellulose wool, pinned into the drawer or box. It is advisable not to get the liquid on the fingers, for it has an unpleasant effect on the skin.—Yours faithfully,

GEORGE C. HOLROYD (253).

Dear Sir,—In *Bulletin, Vol. 10, No. 130,* p. 105, Alan Kindred referred to the fact that no female *Zeuzera pyrina* had appeared among the sixty taken in his light-trap. Perhaps my own observations with a Robinson trap last year may be of interest. The Wood Leopard Moth was found in the trap for five consecutive nights only—and all were males. On those five nights a few females were found on low herbage round the trap, but never in it. In fact, I counted 42 males (41 in and 1 outside the trap) and seven females.—Yours faithfully,

R. W. D. CARR (1175).

Dear Sir,—When I was fishing on the River Wye near Weybridge on August 18th, 1951, I remembered Mr. R. G. Haines' note in *Bulletin, Vol. 10, No. 126,* p. 54, about the Meadow Brown (*Maniola jurtina*) alighting on water. A butterfly of that species was observed to alight on the river two or three times. After fifteen to twenty seconds it would rise and fly a few yards up-stream, and then alight again. At last, however, a gust of wind blew it over sideways and it could not rise again. I saw it last, floating into deeper water and being carried downstream.

While there, I went looking for larvae of *C. elpenor* (Elephant Hawk Moth), but I found only three. These were all browsing on the same plant of Willowherb. I fed them on a different sort of Willowherb, but they took to it quite readily. It was 3.45 p.m. when I found the caterpillars.—Yours faithfully,

DEREK THOMSON (1953*).

If you, too, are puzzled, look out for next month's *Bulletin.*

PRESERVING LARVAE (1)

Since the publication of *AES Leaflet No. 20*,* which describes my method of preserving larvae, I have had a number of requests for advice on certain points where difficulty has arisen. As these queries may be of general interest to other users of the methods described, I append the following notes in query and answer form.

Q.1—What is the cause of the setae of hairy larvae curling during drying?

A.1—The oven is too hot. After inflating the skin, light the heating apparatus and start drying with the oven cold or only slightly warm. Once the moisture is dried out of the setae, the heat may be increased. This will practically eliminate this trouble.

Q.2—Why do the setae of some hairy larvae fall out during rolling?

A.2—This is a problem and difficult completely to prevent, as the hairs of some species are very slightly attached to the epidermis. The trouble can be reduced by selecting larvae which have moulted no more than twelve hours previous to preserving, and by using the least possible pressure when rolling out the contents of the skin. It is also useful to dry the hairs with blotting paper prior to rolling.

Q.3—Trouble is experienced in removing the skin from the jet after drying. How can this be prevented?

A.3—There are three main reasons for this trouble: (i) inserting the jet too far into the anal orifice; (ii) preserving the larva too soon after a moult; (iii) using immature, dead, or moribund larvae. For the first, the solution is obvious. In the second and third examples the skin is thin, soft or partially decomposed and removal from the jet often involves loss of the anal claspers or flap. If a drop of methylated spirit is applied to the offending spot, it will nearly always free the adhesion. The best method is to employ several jets and allow each to become quite cold before removal of the skin. As the glass contracts, so, in nearly all instances, will the skin loosen and damage be less likely to occur. Never move the skin up and down to free it, but always from side to side. Otherwise it will break across the ventral area. Always try to *push* it off the jet from behind the annal flap.

Q.4—How can I persuade skins of the *Geometridae* to assume a looping attitude?

A.4—Insert a short piece of wire under the band securing the spring clip, exactly opposite the clip. Place the skin on the jet and secure it with the clip in the usual manner and give it a puff of air to fill it out. Arrange the skin in the desired attitude and secure it to the wire with a loop of thin, soft cotton placed just behind the head. An additional tie should be placed at the anal end. Do not tie too tightly. After manipulating into the desired position, dry as usual, but use as little air pressure as possible. When dry, snip the cotton, bend down the wire, and remove the skin from the jet. It is not so much the method as the manipulator's patience and care which matter in this instance.

(*To be concluded*)

H. E. Hammond (423).

*This 14-page Leaflet is fully illustrated and may be had for one shilling plus three-halfpence postage from 1 West Ham Lane, London, E.15.

AN EXPERIMENT IN MARKING BEETLES

In September 1951, on Skokholm Island, off Pembrokeshire, marking experiments were conducted on three species of beetles—*Colymbetes fuscus* (L.) and *Ilybius ater* (Deg.) in North Pond. and *Staphylinus olens* Muell. The intention was to discover if it were possible to obtain significant results on the population, distribution, and other aspects of these species, and to test the efficiency of a cellulose paint in marking aquatic and terrestrial beetles. Although the results have not attained the quantitative aims, it was considered worthwhile to publish some of the data as an example of the pitfalls encountered in work of this nature.

The marking was done in two ways; firstly by a small mark of cellulose paint, and secondly by a small clip in an elytron, as a check on the sticking power of the paint, a different place being used for marking each day. It was found that the paint was not satisfactory on *I. ater*, because 17% of those recovered (275 marked, 47 recovered) had lost the paint, showing the utility of a check clip. The effectiveness of this paint varies with the surface texture of the part to which it is applied.

It was not lost from either *S. olens*, which has a more rugose exterior, or from *C. fuscus*, but the number of recoveries of the latter species was small. Clipping in itself is not entirely satisfactory, due to possible mechanical and physiological damage and limited clipping positions.

Although the data for population estimation is not statistically significant, the figures for *C. fuscus* are of interest in that they show a remarkably daily variation in numbers. This species was first taken by Walton in 1933, but has not since been recorded, although several people, including the authors, have recently worked on the aquatic fauna of N. Pond. The following list shows the number taken (and returned) daily in 2 man-hours' collecting at the same time of day.

Sept.	Nos. taken.	Sept.	Nos. taken.
1	0	7	2
2	0	8	0
3	1	9	0
4	44	10	1
5	50	11	0
6	7	12	2

This is a good illustration of the danger of estimating the relative abundance of a species on only a few days' observations. After the first seven days it seemed that the distribution of the aquatic beetles was in simple correlation with the wind direction; but further observations showed this to be erroneous. Perhaps the most important thing to be learned from the experiments is the folly of making deductions from an insufficient number of observations —a lesson eminently worth while.

A. E. G. PEARSON (1677)
and W. WILKINSON (2037).

A NOTE ON *CELÆNA HAWORTHII* CURT.

An old entomologist once told me that if I wanted to take Haworth's Minor, I must take a walk on to the moors after dark with a lamp and net the moths as they appeared out of the gloom. I never felt this was good advice, for, apart from the fact that the moth is a swift flyer and difficult to net even during the daytime (when it often flies in the hot sunshine), footling about in darkness over rough moorland interspersed with sphagnum bog, deep peat pools and gullies, can be highly dangerous. Such, at any rate, is the normal habitat of the species in this area (W.R. Yorks.), where it is common on most of the moorlands supporting a flourishing growth of its foodplant (Cotton Grass, *Eriophorum*).

For those who are unfamiliar with the species in its natural haunts and who may wish to search for it, I make the following observations. The moth is not a wall-sitter like *chi*, *bombycina* and other upland Noctuids, and is best taken during the daytime when it visits heather bloom (*Calluna vulgaris*)—late afternoon is best. Locate a piece of moorland where a good extent of Cotton Grass is growing in association with heather; the moor edges are perhaps best as wet Cotton Grass moorland usually gives way to drier ground there, favouring heather. When searching the heather, do not wade through it at walking pace or very few, perhaps no moths will be found—for this reason: the insect, although apparently engrossed in the business of sipping the nectar, is very keenly on the alert and on being approached (it evidently sees you first) makes a mouse-like dive into the heather bottom where it feigns death, usually on its back; the underside in perfect harmony with the brown peaty earth. Examine the heather very carefully and providing no jerky movements are made, the moths may be pill-boxed with ease. Sometimes several will be found together on one heather clump, in which case it will be found best to single out one moth for boxing; the rest will make a dive for it. By this method large numbers of the moths may be examined and only perfect or better-marked ones taken.

South's illustration of this insect, whilst typical of many, hardly does it justice, because the species is variable, both in tint and marking. The male in particular is often richly coloured, various shades of pale reddish-brown to purplish-red being usual.

It is best taken about the beginning of September, when newly-emerged, but it knocks about until well into the autumn. In 1951 it was noted in very worn condition on Ilkley Moor (Yorks.) as late as 1st November.

C. R. HAXBY (1508).

OBSERVATIONS AND QUERIES

Mr. R. S. Haynes (1545) reports the following two incidents:—" On June 28th, 1951, I was at Penlee Point (the Cornish side of Plymouth Sound) searching the heather for eggs of the Fox Moth (*Macrothylacia rubi*) when I found a newly-hatched female Fox Moth drying her wings and nearby a male, also newly emerged. This led me to intensify my search and, a little later, I heard a fluttering sound in the dry twigs of an old heather bush. Then I saw a female Fox Moth with a male crawling over her and fluttering his wings, tearing them to pieces on the close-growing dry twigs. I watched for a while; but, as the female seemed to make no response, I boxed the male Then, when I attempted to take the female, I was astonished to find her dead and stiff! I presume that, although dead, she still possessed sufficient scent to attract this male. I placed the dead female on the grass, but, although males were flying in numbers, no more were attracted."

" On August 10th, 1951, in the vicinity of Stornoway, Isle of Lewis, I noticed a number of Antler Moths (*Charaeas graminis*) in daylight fluttering and crawling about one particular spot where the grass was apparently too short to conceal anything. As one moth flew away it would be succeeded by another, sometimes two or three, all seeming to concentrate on this spot and behaving in the manner of assembled males. I decided to investigate, dividing the grass and disclosing among the roots a female Antler Moth. She was newly emerged, as her wings were but half expanded, and she appeared to be struggling to escape from the tangle of roots. I helped her and was surprised to find she was in the jaws of a large hunting spider, yet still emitting sufficient scent to attract the males of the district. I did not interfere with this tragedy of Nature."

Mr. J. H. Johnson (1040) reports:—" On August 1st, 1951, at about 9.15 p.m., I was travelling to Britton Woods to ' sugar ' for moths. I observed a large Dragonfly hawking moths in the shelter of a stone wall bordering Mill Lane, Woodthorpe (a village five miles south of Chesterfield). It caught several Grass moths and Garden Pearls and ate them on the wing. It was nearly dark, the sun having gone down several minutes earlier. I was able to catch the creature when it alighted on a plant to deal with a moth it had captured. It was a fine male *Aeshna grandis* (L.); but I was unable to find the moth, which had appeared to be quite a large one."

A. D. Kindred (*1707) took in his light-trap at East Bedfont, Middlesex, a Marbled Clover Moth (*Heliothis dipsacea*) on 3rd August 1951.

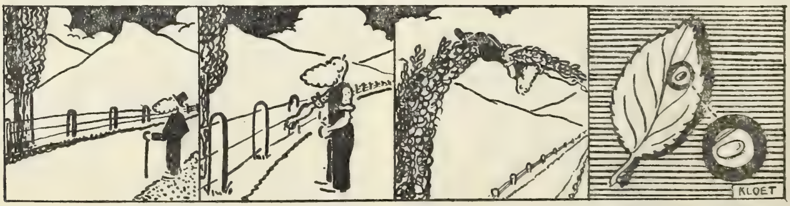
Mr. E. Harrison (1676) took a male Oak Hooktip moth (*Drepana binaria*) at an illuminated sheet in South Westmorland on 29th August. South says that this moth is not found north of Lincoln: is this a first recording?

Mr. J. H. Barrett, Warden, Dale Fort Field Centre, Haverfordwest, asks members to contribute their own or bibliographical records for a List of Macrolepidoptera of Pembrokeshire.

FELLOW TRAVELLER?

At 8.30 a.m. on 6th September 1951, I saw *Euphyia bilineata* (Yellow Shell) at rest on a pillar on platform 3 of Charing Cross Station. One wonders if it had wandered in from the Embankment Gardens or had travelled up from the country. The suggestions that it was a season-ticketholder or had come for the South Bank Exhibition can, I think, be ruled out.

L. W. S. (243).



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AES NOTICE

WHERE TO WRITE

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH M.A., A.K.C.

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AES BULLETIN

No. 135

MARCH 1952

EDITORIAL

Albeit with considerable misgiving, *faute de mieux*, I have agreed, subject to the approval of the Annual Meeting,* to convert my "acting" editorship to the holding of the office. Perhaps, therefore, this is an appropriate time to be explicit about our editorial policy. The AES has a special function to perform in increasing the "know-how" about rearing, breeding, collecting and identifying insects by publishing the sound practical experience of our members: and there is real value in the records of failures, if they clearly reveal what actions to avoid. We want to widen the interests of our members and so place emphasis on giving space to not-too-specialised articles on the less-studied Orders. We want to give a chance to the junior members to make their first appearances in print, by publishing, for example, good observations of unusual happenings in the insect world. On the other hand, we do not wish to compete with the well-established journals in printing a great deal about the local recording of well-known species. We hope that such observations will be sent direct by members to our Advisers or to the leaders of our various study groups (listed in *Bulletin, Vol. 10, No. 127*, pp. 82-83). The compilation of extensive local records will be announced, so that other members may write direct to the compiler.

The Editor should not, could not, and ought not to feel any need to write the *Bulletin*. His function is to select the best which is offered to him and sometimes to seek a contribution. The more material he receives, the better chance he has of making the *Bulletin* both varied and interesting. Please send him your efforts, however short (brief notes are very valuable for filling out uneven columns and so securing a pleasant appearance—which has its own importance); but do not grieve if, in the end, no use is made of them. Do not, however, jump to conclusions about rejection. It takes a full six weeks to get an issue through the press and very often the Editor has planned his space three months ahead.

*The Agenda for the Annual Meeting is enclosed separately.

Drawings are also welcome to illustrate your text—and good funny ones too. These should be done in indian ink and preferably drawn twice the size of the eventual illustration. Please notice that our columns are 2 1/10″ wide, so that your drawing should be not more than 4 1/5″ wide and usually at the most 7″ tall. Don't be afraid, however, to offer rough pencil sketches if you really have a good idea to show. Clear photographs can sometimes be turned into quite informative line drawings too: we cannot afford to print them as photos any more. We are fortunate in having one or two artists among our membership who volunteer to turn out line drawings; but the Editor tries to avoid pressing them too hard.

Please write as clearly as you can and on one side of the paper only: the Editor has no team of typists and the Printers work cheerfully from good manuscripts which don't have to be turned over. You can save me a lot of time and trouble by counting and recording the number of your words.

Finally, about scientific names. To avoid confusion, the Editor will wherever possible use Kloet and Hincks' "A Check List of British Insects" as his arbiter. A copy of this work has kindly been presented by the President to the Society for editorial use.

W.J.B.C.

LOCAL RECORDS

Mr. D. H. Heppell (1690) has prepared a detailed study of butterflies and moths collected in the area enclosed by a line from Lee-on-Solent to Litchfield and thence to Knowle and down to Havant. He compares 1950 and 1951.

Mr. B. R. Thomas (1709*) has made a short record of his collecting in Carmarthenshire, 1949-1951.

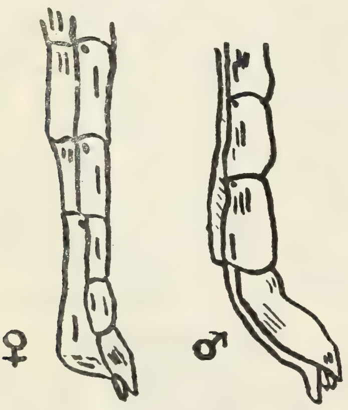
Members interested should write direct for the loan of the manuscripts.

STICK INSECTS

Noah might well have been puzzled to know where to look for a male Stick insect to accompany his lady into the Ark (see *Bulletin, No. 134*, p. 13). He certainly could not have been expected to know that one wasn't necessary. It is however a fact that these Phasmids can reproduce through several generations without the appearance or intervention of the male sex.

Mr. G. G. E. Scudder (2032) would like to hear from other members who have bred males of *Carausius morosus*. Since 1948 he has bred *C. morosus* through successive generations of females only, keeping them in a living room where there is a constant moderate temperature, and feeding them on privet (*Ligustrum vulgare*). He writes:—

"In June 1950, I noticed one insect of a batch that had hatched in December 1949 was different from the rest. It was somewhat smaller and more slender, but had longer antennae, than the other insects. Its colouring was also different in that, beyond having the crimson maturity marks on the first pair of legs, there was much colouration on the other legs and also the ventral surface of the thorax. The posterior end of the body was also very different, as may be seen in the diagrammatic figure (which has not been drawn to scale).



C. morosus (diag.)

"There was no difference in the length of legs of my male, although it is frequently stated that the female has shorter legs. Its antennae measured 3.5 cms. (as against an average of 3.0 for the females) and the body was 5.5 cms. long (compared with 7.25 for the females) and of lesser diameter segment for segment.

"This male resembled the females for the first six months and was kept with them; but no sexual activity was observed at any time. It was eventually removed from their company when a malady arose among them. It died in April 1951, having lived for nearly seventeen months, some two months longer than the normal female span.

"I should like also to hear of other members' experiences of diseases afflicting *C. morosus*. There is apparently a fungoid malady which causes the legs to drop off. The disease which spread through my cages caused the abdominal part of the body to become very thin and dry and the anal/genital apertures appeared to lose their power of functioning."

(*We have been promised a series of notes on the Stick Insect, including its susceptibility to induced trance.*—Ed.)

•

ASSEMBLING IN THE HYMENOPTERA

With reference to Mr. H. G. Morgan's note on page 96 of *Bulletin No. 129*, I had a somewhat similar experience on the South Lancs. sand-dunes near Freshfield on July 22, 1949, a sunny and hot day. I found a quite small but rather thickly planted clump of Black Poplar on the hollowed out northern side of a hillock, with a few shafts of sunlight penetrating the canopy of leaves. One of these shafts was playing on some sucker growth 4 to 5 ft. high springing from the base of a trunk, and I noticed a few obviously hymenopterous insects flying about, and settling on, the leaves. I brought several home and they proved to be a small ichneumonid belonging to a species which is (for these difficult parasitic groups) fairly easily determinable, viz., *Chorinaeus cristator* Grav. It was possibly a mating swarm, but no pairing was observed, an event very rarely seen in the Hymenoptera.

When living in Staffordshire I have from time to time noticed small swarms of Diplazonine ichneumonids flying round the tips of fruit tree branches in my orchard, sometimes affecting the same twig day after day; but I never took a female amongst them even by sweeping the

affected twig. One species, the common *Diplazon pectoratorius* Grav., used to fly in exactly the same place on the wood margin adjoining the orchard year after year, but no amount of painstaking sweeping of the herbage below the swarm and the branches round and above it ever produced a female. The very few females of this species I possess have been taken by casual netting or sweeping.

H. W. DALTRY (972).

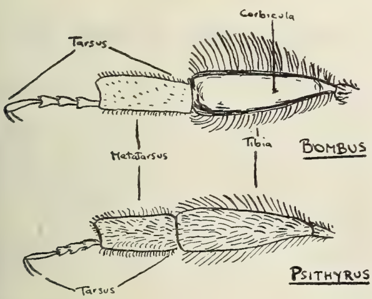
BUMBLE BEES (2)

(*Continued from page 10.*)

Characteristics

The family Bombidae contains the two British genera *Bombus* and *Psithyrus*, which differ not only in their life histories, but also in certain structural features. The female *Psithyrus* is usually less hairy, having rather a shining appearance, and its sting is more powerful than that of the female *Bombus*. The abdomen is usually incurved and the joints on the abdomen are definitely overlapping and thus extremely well protected. The inter-segmental membranes are tougher than in *Bombus*. The jaws of *Psithyrus* are less suited to moulding wax and more suited to biting, because the jaw muscles are stronger. Perhaps the best distinguishing character is the presence of a corbicula or pollen basket in the genus *Bombus*. This is not present in the genus *Psithyrus*. The hind tibia of *Bombus* is concave and shiny, fringed with long hairs on its outer surface (see figure);

HIND LEGS

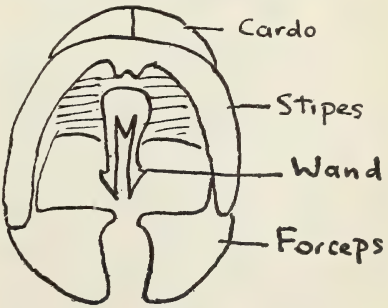


this feature is connected with the pollen-collecting habit, which is not found in *Psithyrus*. The same structural distinctions generally hold good between the males of these two genera, but the surface of the tibia may be flat rather than concave in *Bombus* and may even be covered with hairs. These hairs, however, are never branched, as many of them are in *Psithyrus*. All the features mentioned can be regarded as modifications resulting from the parasitic mode of life of *Psithyrus*. Other differences are the absence of workers in the genus *Psithyrus* and the slightly lower pitched hum produced by members of this genus.

Before identifying any species by means of the key with which I shall end this series, it is essential to know the generic characteristics and I, personally, find the tibial character to be a very reliable one, even for the males.

Scientific Classification

It is well-known that the best way of studying classification and relationships in insects is by recognition of the genitalia. In the Bumble Bees all but the very closely related species have distinct genitalia. In the male the armature can easily be removed from the last visible segment of the abdomen with a pin, and can either be mounted dry on a card or a microscopical slide made. The specific characters lie in the shape of the wands and forceps (see figure). In the female the sting should be squeezed out. It is in the shape and chitinisation of the inner projections of the sting sheath that the specific characters lie. If accurate drawings of the genitalia of as many species as possible are made, they will prove an infallible method of identification. Excellent drawings of genitalia of Bumble Bees can be found in O. W. Richards' article (see below).



Male Armature of *Psithyrus rupestris*

Vogt divided the genus *Bombus* into sub-genera on the characters of the genitalia and this is useful, since it shows which species are closely related.

Genus *Bombus*.

Sub-genus (Vogt's).	Species.
Hortobombus	*hortorum.*
,,	*ruderatus.*
Subterraneobombus	*subterraneus.*
,,	*distinguendus.*
Soroënsibombus	*soroënsis.*
Lapidariobombus	*lapidarius.*
Pratobombus	*pratorum.*
,,	*jonellus.*
,,	*lapponicus.*
Cullumanobombus	*cullumanus.*
Bombus	*lucorum.*
,,	*terrestris.*
Agrobombus	*agrorum.*
,,	*humilis.*
,,	*smithianus.*
,,	*muscorum.*
,,	*sylvarum.*
,,	*ruderarius.*

Bombus sylvarum and *B. ruderarius* form a small group within the group *Agrobombus.*

In the genus *Psithyrus* only two species are more closely related to one another than to the rest and these are *Ps. vestalis* and *Ps. bohemicus.*

Collecting and Studying

Specimens should be captured in a net or net forceps and transferred to some kind of container. Care should be taken in transferring females, for they can sting! Apart from this operation, there is no need for any fear of stings because the insects will not usually sting unless frightened or angry. If they are wanted for a collection ethyl acetate is probably the best killing agent, because it leaves specimens relaxed. Insects brought back from the field alive are best kept in the dark because this will keep them quiet. Setting can be done on an ordinary type of board as used for lepidoptera, the legs and wings being spread out on the board. The width of the trough is the limiting factor and widths used will vary from 0.3 inches to just under 0.5 inches.

In making a collection it should be remembered that Bumble Bees are useful creatures and, like all insects, could suffer from over-collection. This applies especially to the young queens in spring, for the lives of a future community depend on the safety of the queen.

A rudimentary collection is almost an essential first step in one's study, and, if it is carefully labelled, may be of value to science, especially with regard to distribution. It should always, however, be thought of as a means rather than an end.

Bibliography

F. W. L. Sladen. "The Humble Bee, its life history and how to domesticate it." Macmillan and Co., 1912.

Unfortunately this book is now out of print, but second-hand copies can be obtained. It is a book that every student of Bumble Bees* should try to obtain sooner or later. The colour plates are excellent and it is very readable as well. The AES was permitted to copy extracts from it in "The Hymenopterist's Handbook." (*The Amateur Entomologist, Volume* 7, 1943). Besides giving details of Sladen's observation nests, the Handbook is very useful for general information on the Hymenoptera.

More advanced works are:—

O. W. Richards. "The Specific Characters of the British Humble Bees." *Trans. Royal Entomological Society London, Vol. 75,* pp. 233-268, 1927.

R. A. Cumber. "The Biology of Humble Bees with special reference to the Worker Caste." *Trans. Royal Entomological Society, London, Vol. 100,* pp. 1-45, 1949.

(*To be continued.*)

T. B. Poole (1681).

PRESERVING LARVAE (2)

(*Continued from p. 14*)

Q.5—What is a good green colouring matter to use for tinting?

A.5—The tinting of preserved larval skins is a controversial matter as it often obscures characteristics such as white markings and spiracles. If used, tinting should be very discreetly employed. Paints of any description should be rigorously

*The traditional English name for these creatures can be either "Bumble" or "Humble" and the Editor asked me to choose the former, as being nearer to the Latin. It will be noted that the authors I cite all preferred the alternative.

banned. I find that a substance known as "chrysodine," dissolved in spirit, is very suitable, as a light application does not badly obscure any desirable characteristic. This dye may be obtained from fishing tackle shops and is employed by Isaac Walton's followers for dyeing maggots or "Gentles." A packet costs a few pence and should be dissolved in about four tablespoons of spirit. Use only a drop or two of this solution at one time and thin down to the desired shade (it is very strong). Methylated spirit will serve very well as the vehicle.

[I will insert a query here—How on earth did Blowfly maggots acquire the designation "Gentle"?]

Q.6—Some skins persist in curving sideways instead of drying nicely straight. How can this be prevented?

A.6—Warm the skin, withdraw from the oven and manipulate into position. If it again curves, keep inflated, and then touch the convex side on the hot oven, *after* bending into shape. This will slightly shrink the convex side. Do this several times until the desired result is achieved and then complete drying. This trouble must be rectified at the commencement of drying and not be attempted after the skin has stiffened.

Q.7—How can large skins, such as those of Hawk Moths be prevented from drooping, as the only cure seems to be to over-inflate to keep them stretched out straight for drying.

A.7—Use two clips on the blowpipe, exactly opposite each other. Use the top one to secure the skin as usual. Then, instead of using wire, as suggested in answer 4, cut a piece of perforated zinc into a rectangle about 4″ × 1″. Secure this under the jet and hold in position with the second clip. The skin will rest on this and just sufficient air can be pumped in to keep the skin as desired. Remove the zinc platform before releasing the skin, but allow it to cool off first! When drying large skins, endeavour to dry the anal end first. This will help to keep them in position with less air pressure.

I would like to see larval skins in all collections and, naturally, am always glad to receive queries or suggestions for any improvement in technique. My address is in the Membership List, so if I can help with advice or you have anything to suggest, don't hesitate to write.

H. E. Hammond (423).

LAST WORDS ON MERCURY VAPOUR LIGHT TRAPS

Recently most entomological journals seem to have had opinions to express, for and against the use of mercury vapour light traps; and the Classey-Robinson letter in the *Bulletin, Volume 10, No. 131*, p. 114, might seem to be the last word on the subject: in which case I ought, as a "mercury vapourist", to hang my head in shame, pack up my collecting, etc. However, here is my story. In 1951, for the first time, I used an inverted cone trap with a 230 v. 80 w. m.v. light, which was on every night in my own front garden, which is on the outskirts of the town, from April 1st up to the end of October.

I am, of course, an amateur collector and my activities would normally be confined to week ends, and the possibility of all night outings even then would be rather remote (lack of transport, plus the fact that wives don't like being left in a house alone all night, even in the summer). But the use of the m.v. in such an unpromising locality has given me my best year ever—and 1951 was far from being a good year generally speaking. I have found it unnecessary to use any killing agent at all in the trap, although, of course, there must have been a higher percentage of escapes as a result. Most specimens that were required were in a good condition and had settled down inside the trap in the dark. In the process of emptying each morning, a few more escaped, but I still found I had as many specimens to deal with as I could find time for. Those that

were not required were boxed, and later released well away from the trap.

Between seventeen and eighteen thousand were recorded on a carding system, these being of nearly two hundred and fifty different species of macrolepidoptera: about five per cent. of the total were killed and set. The chance of looking through such a number in one season without this method, would to me have been impossible; the range of variation in some species was most interesting and could only have been found by examination of large numbers. The times of appearance, the first and last dates, the abundance or otherwise, the occurrence of second broods, all these things became really apparent for the first time. What actually flies past one's own front door, or I should say a percentage of it, has to be seen to be believed. I would go so far as to say that no county list can be considered anything like up to date, unless extensive use of such a trap has been made over a considerable period of time in all areas. I don't wish for anything more powerful than this, although much improvement was mentioned by Messrs. Classey and Robinson: how many collectors could possibly deal adequately with thousands of moths night after night?

To sum up, I shall go on using the m.v. trap, and may it enrich my private collection for many a year to come. As to the "ethical standards involved", I trust I may not be judged an indiscriminate collector, but at least on honest one.

P. J. Gent (192).

I applaud the letter from Messrs. Classey and Robinson and would like to express my admiration of the excellent and public-spirited lead they have given, in themselves ceasing to make personal collections of British Lepidoptera since starting to use this formidable collecting weapon.

In view of the existence of this grave risk to our native fauna, I do not feel it would be unduly precipitate to seek to nip the danger in the bud, and to support the restrained behaviour of the responsible, by drafting actual *legislation* to prevent misuse by the irresponsible. A very simple Bill, such as one making the use of high-luminosity light traps subject to permit from, say, the Natural History Museum, would suffice and should need no complex inspection system for its implementation, since the overwhelming majority of entomologists would support it, the few backsliders would inevitably give themselves away by their ill-gotten gains, if not by their nocturnal activities. A mercury-vapour lamp would be of little use under a bushel!

I hope some discussion of this matter will take place in the Committee for the Preservation of British Insects and shall myself press it upon that body.

W. B. Broughton (1632).

I do not wish to enter into the ethics of the subject, but I can vouch for the statement that a mercury vapour lamp and a sheet will provide the ordinary collector with a satisfactory means of collecting. I have been using one on and off for two years and more intensively in 1951 than before; the results, compared with ordinary forms of collecting, have been astounding and the fun terrific!

During last summer there were nights when the sheet was alive with literally hundreds of moths and the difficulty was to decide what to box first. As one goes to box one desirable insect, two or three others appear—and a cool head is needed if specimens are not to be missed.

Finally, there is considerable satisfaction in knowing that, when the light is switched off and the sheet rolled up, the unwanted specimens are still alive and unharmed—and will, in all probability, join the throng on the next occasion you use the lamp.

A. C. R. Redgrave (1639).

Mr. MacKechnie Jarvis (650) draws attention to an amusing section of the Editorial columns of the *Electrical Times* (6.12.51) which concludes:—" Subtlety on sublety, it has now been found that the response of moths is much greater to light in the ultra violet region, and it is reported that by the use of a mercury vapour lamp no less than 25,000 moths were caught in one night. Rightly, entomologists have become alarmed at this carnage of insects which eat our vegetables and destroy our fruit, and nobly has the inventor responded by placing his invention in the official custody of the Natural History Museum. So is preserved our noble tradition of kindness to animals, and no more will moths suffer from sleepless days for fear of electric light."

Whatever may be the views of individual members on light-trapping, we hope that all will be particularly scrupulous not to do damage to the species of moths about which the Committee for the Protection of British Insects is currently most anxious. These are:—*Aegeria chrysidiformis* (Fiery Clearwing), *Aplasta ononaria* (Rest-Harrow), *Catocala fraxini* (Clifden Nonpareil), *Colobochyla salicalis* (Lesser Belle), *Epinone vespertaria* (Dark Bordered Beauty), *Euenaemidophorus rhododactylus* (Rose Plume), *Eustroma reticulata* (Netted Carpet), *Minucia lunaris* (Lunar Double-stripe), *Scopula immorata* (Lewes Wave), *Sedina buettneri* (Blair's Wainscot), *Thalera fimbrialis* (Sussex Emerald).

EDITOR.

INSECTS IN A MINE

MR. W. BILBIE (1679) who in 1950 found a number of living insects in a Derbyshire coalmine (*Bulletin, Vol. 10, No. 125,* p. 47) has reported upon his observations in the same mine during 1951. In the following list of moths, the date of capture is indicated by numerals showing day and month:—

A. aescularia. 3.3.
A. c-nigrum. 19.7.
A. caja. 27.7.
A. exclamationis. 15.7.
A. grossulariata. 13.7; 27.7.
A. rhomboidaria. 28.7.
B. betularia. 28.7.
C. amata. 11.9.
C. blanda. 28.7.
C. clavipalpis. 15.7
C. morpheus. 26.7.
C. vinula. 9.6; 16.7.
D. elpenor. 29.6; 3.7; 13.7; 21.7.
D. tiliae. 16.7.
E. chrysorrhoea. 28.7; 2.8; 9.8.
E. nigricans. 29.6; 3.7.
H. chenopodii. 9.8.
H. oculea. 28.7.
L. conigera. 27.7; 7.8.
L. lithargyria. 19.7.
L. pallens. 15.7; 16.7; 20.7; 27.7; 28.7.
O. atrata. 5.7.
O. ochracea. 20.9.
O. sambucaria. 16.7; 25.7; 2.8.
P. chrysitis. 15.7; 27.7; 2.8.
P. gamma. 27.7.
P. iota. 29.8.
P. tenebrata. 6.9.
S. lubricipeda. 3.7; 4.7; 5.7; 28.7.
S. lutea. 3.7; 16.7.
S. sylvestraria. 7.8.
X. lithoxylea. 20.7.
X. monoglypha. 16.7; 9.8.
Notarcha ruralis (a Pyraustid). 7.8.

All except one of these moths were found within twenty yards of the bottom of the pit-shaft (which is 450 yards deep). This area is well lighted, but it is highly improbable that the insects were attracted down towards the light. It is more reasonable to assume that they were taken down on or in the cage, or sucked down by the draught behind it. The exception was caught half a mile from the shaft bottom, flying with the air current towards the workings. Mr. Bilbie saw most of them between 10.30 and 11.0 p.m. According to the man in charge at the shaft bottom, moths fly around till about 4.0 a.m. and then "just seem to vanish".

Several wasps had been recorded in 1950, but only one Wood Wasp was seen in 1951—at 3.0 a.m. on July 26th. It had probably emerged from a pit prop. That was observed to be the origin of eleven beetles (*Molorchus minor*, see figure) which were caught at 2.45 a.m. on a pit prop fixed between two steel arches a mile and a half from the shaft.

On September 6th, at 11.0 p.m., a Peacock butterfly (*N. io*) was seen flying along the wall sides as far as 50 yards from the shaft bottom and then returning, as if it were seeking a way out.

Mr. Bilbie is fairly confident that one species of micro-lepidoptera actually lives and breeds down the mine, the larvae feeding on rotten timber. It is found mostly in a road now disused. He offers to catch some of these micros for expert determination and observation, if an expert would care to write to him. He has, however, never managed to find the larvae or pupae.

DWARF IMAGINES

The notes about dwarf imagines in the *Bulletin, Volume 10*, pp. 85 and 116, reminded me that on 12th May 1948, I took a female Green-veined White (*P. napi*) which measures only 35 mm. The greatest difference in sizes I have experienced is that between two Poplar Hawks (*L. populi*). I took a female measuring 95 mm. near our R.A.F. Balloon site in June 1940; whilst a bred male emerged in an unheated room in June 1948 which is only 60 mm. from tip to tip. All three are perfectly formed specimens.

R. H. Benson (1444).

REVIEW

Fragments of New Zealand Entomology by (the late) G. V. Hudson. Pp. 188; 2 plain and 17 coloured plates. Privately printed, for Mrs. W. H. Gibbs, 291 Muritai Road, Eastbourne, Wellington, New Zealand. [Undated, but 'Foreword' dated 16th July 1950. Published 1951?]. Price 60/-.

This volume is a miscellany, dealing with Coleoptera (19 pp.), Hymenoptera (11 pp.), Lepidoptera (51 pp.), Neuroptera (8 pp.), Homoptera (30 pp.), miscellaneous observations (13 pp.), swarms on mountain tops (5 pp.), aspects of modern methods in entomology (9 pp.), and—perhaps the most fascinating part of the whole work—a long account (23 pp.) of the "New Zealand Glow-worm", forming the first chapter of the book. This remarkable insect, which is not a beetle, but a Mycetophilid fly or "fungus-gnat", has a luminous larva that lives in a kind of web or tube of slime suspended in dark places, such as ravines and gullies, and feeds on the small insects that become entangled in the sticky web. It also lives in pitch-dark subterranean caverns, where the countless myriads of these gleaming larvae covering the walls, roof and even stalactites, must surely form one of the most incredibly wonderful and beautiful natural spectacles to be seen anywhere in the world.

The coloured plates are of very high quality, the work of a London firm, Messrs. Craske, Vaus & Crampton, Ltd. Seven are of Lepidoptera, four of Coleoptera, three of Homoptera (cicadas), one of Neuroptera (*s.str.*), one of Diptera, and one miscellaneous. Many larvae and pupae of all these Orders are figured, and the text contains many interesting observations on habits and life-histories. One curious feature of the work is the almost complete omission of authorities for specific names, which must detract somewhat from its utility.

Amidst such a varied and fascinating assortment of insects it seems almost invidious to single out objects of particular interest, but among the species figured one may draw attention to the exquisite Tipulid fly, *Molophilus pulcherrimus*, Pl. I; the grotesquely-winged Anthomyiid fly, *Exul singularis*, Pl. II; the curious little larva (greatly magnified) of the scarce Arctiid moth *Celama parvitis*, Pl. III; the lovely little Tineid, *Bascantis sirenica*, Pl. VII; the stag's-horn antennae of the male of the Anobiid beetle *Cyphanobium illustre*, Pl. XI; and the very odd brachypterous Clerid, *Paupris aptera*, and fantastic Tenebrionid, *Paraphylax binodosus* (both on Pl. XII), neither of whose families would, I am sure, be guessed by the average amateur coleopterist of the North Temperate zone. Though butterfly-collectors may be surprised (as I was), and perhaps disappointed, to learn (p. 160) that there are only 15 Rhopalocera in New Zealand, it is clear that the Heterocera and 'other orders' provide enough beauty and wonder to more than compensate for this deficiency—even to the heart of the most jaded lepidopterist!

H. K. A. S. (*non*-lepidopterist).

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EDITED by W. J. B. CROTCH M.A., A.K.C.

AES BULLETIN

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THE SCIENTIFIC APPROACH

In the October *Bulletin* last year (*Vol. 10, No. 130*, pp. 105-7) we opened a discussion on the scientific approach to problems, in the expectation that it might stimulate further valuable exchanges. On Christmas Day Mr. I. S. Menzies (585) took up his pen to explain his misgivings. While he does not doubt that assistance can be given to the scientist by the amateur when he records his findings in a scientific manner, he asks,

"Is this a justifiable reason for suggesting that a society for amateurs like ours should attempt to become just a part of the great feeding mechanism which science seems to demand these days? Whilst many scientists are also amateurs there surely is a significant difference between the two attitudes. The scientific approach involves the correlation of observed facts and the formation of theories, as suggested in Mr. Taylor's letter; but is not its ultimate aim to reveal the cause and workings of life in material terms? It follows that only the more material and precise observations (crude facts) are acceptable.

"Whether this aim will eventually be realised is open to doubt, nevertheless the urge to attain it is very strong in modern times, so much so that the degree of scientific approach is often used as a measure of a man's usefulness. Should amateurs be interested only in collecting precise facts? Surely they are also interested in that side of their hobby which is not so strictly material. Many must feel that 'There are more things in Heaven and earth, than are dreamed of in your (scientists) philosophy', and the last laugh may be with those who feel this, and like trying to find these things reflected in nature just as the great naturalists of previous generations did.

"If, as it appears 'Science' is the 'Parade' these days, it is surely desirable to have an amateur society which will allow one occasionally to be 'off parade'. But even then we frequently hear the Regimental Sergeant-Major shouting at us in the leaves of our own *Bulletin*, to 'swing our arms'. If I may mix a metaphor, should we not 'swing our arms' with mental reservations! Here I think that Prof. Balfour-Browne's comments suggesting how we can do this are both interesting and helpful because they vividly portray many of the pitfalls which beset those who would cultivate the scientific approach."

It is probably true that many young scientists do not realise that, however much gleaning of facts they do, the answers which they get are only to the question 'How?' never to the question 'Why?'. But there is an even greater compulsion to think clearly put upon those who, like Mr. Menzies, seek to rejoice in the existence as distinct from the intricate mechanisms of life. It is against woolliness of thought and false deductions from evidence that we take our stand. We still hope that some adequately gifted member will write us a note or series of notes on Scientific Method as applied to entomology, so that our amateur efforts to study living insects, from whichever motive, may not be mis-directed and thus wasted.

The value of the correctly applied work of the amateur has been stressed by the American author (Dr. Marston Bates) whose book, "The Nature of Natural History",* has just come to hand. "The amateur insect collectors", he writes (p. 295) "have made considerable contributions to science. It is possible to take a limited group of insects, such as a family of butterflies, beetles or flies, and to become a thorough master of their classification, habits and anatomy, as a part-time activity.

"The amateur naturalist that interests me is the fellow who might have been a professional, but got suppressed in the course of education, or sidetracked by the brutal necessity of finding bread and butter with maybe some jam. Their number is legion, and I think they would gain in satisfaction and pleasure if their part-time activities were oriented within the framework of science. It may not be possible nowadays to make revolution-

*Published by Messrs. Chapman and Hall, London, 1951. Pp. 347. Price 16s.

ary scientific discoveries on weekends home from the office, but a great deal of scientific spadework could be done on such a basis, with benefit both to science and to the amateur."

This is so much in accord with our own views that we are sure Dr. Bates would greatly approve of our study-group plans. There is nothing high-falutin' about his attitude. "I have long maintained", he says (p. 307) "that a naturalist should be able to do good work with no materials beyond paper and pencil."

Observation by itself however will seldom yield full value. The amateur making the observation should know what of significance he can look for: he must have suitable "frames of reference". The reading of this book will give them to him with the minimum of difficulty and a great deal of pleasure.

Dr. Bates' expressed intention in writing for the layman was "not to impress with the facts of biology, or with the marvels of what we have learned about the processes of life. Rather . . . to arouse interest in an attitude . . . The facts of biology have penetrated the nursery, the kitchen, the garden almost as much as they have the farm or the hospital. But the attitude of biology, the general method of science, seems to have made no corresponding contribution to our culture, to have resulted in no comparable alteration of our intellectual processes."

The book starts with an explanation of the naming system, leading naturally to a sketch of the major divisions into which organisms are classified. The fossil record is used to show how the divisions "fit". The continuity of the history of organisms leads on to a consideration of the phenomena of reproduction, growth and development; and thereafter the organism is looked at as an individual within an environment, and one by one the kinds of relationships it may have with other individuals of its own or other species are examined. The author devotes his last chapter to "Tactics, strategy and the goal", so bringing scientific method within his ambit. An appendix usefully reviews the kinds of literature available. This book should be read by all our members who feel any inclination to be something more than acquirers of dead insects. There is much revelation in it for those who want only "to stand and stare".—Ed.

LOOKING FOR VARIETIES

Because Great Britain is not rich in butterflies, it should be possible to get together a full collection of all the British species, excluding the varieties, by a little travelling for holidays and in five or six seasons. But include all the varieties, and it becomes an interest for a life-time.

I think of varieties as being classified into four groups: the first, rare and striking; the second, rare and slight; the third, common and striking; the fourth, common and slight. In this connection, I am applying the term " rare " only to the variety and not to the species, regardless of whether that particular species is common or difficult to find. Under my classification, *P. c-album* var. *Hutchinsoni* used to be Group 3 in the days when the speeies was still a rarity, because the proportion of *Hutchinsoni* to all those I came across was as high as one in ten.

If you are interested in seeking varieties (and I hope this will be because you want to try breeding from them), you might best begin with *A. urticae*. The editor has drawn the accompanying figure from my photographs of examples of the Small Tortoiseshell that I have captured. Var. *nigra* is rare and striking; *polaris* is common and striking; the modified *polaris* is common and slight.

When you want to know whether a variety is striking or slight, the best test is whether you have to take a second look before noticing that it is not a typical form; striking varieties will be noticed at first glance at a still insect. If in doubt as to whether a variety is rare or common, search for it. There is no surer way of finding out. Catching (and letting go) *A. urticae* as often as you can, you will probably find a dozen *polaris* before you will take one *nigra*.

In the variety *polaris* the large central spot on the forewings is in head-on collision with the middle black bar at the top of the forewings, while in the typical form they are well separated. This difference stands out clearly. But *polaris* (modified) has the large central spot and the black bar hardly making contact. This can easily be missed at first glance.

Searching for varieties can be hard work, but it is never dull, because the undercurrent of excitement once one has come across an interesting specimen sharpens one's interest.

Careful searching will nearly always provide an example of a variety worth breeding or keeping. The late J. Frohawk's book, "Varieties of British Butterflies," gives a wonderful insight into what may be looked for among our Rhopalocera—and, of course, there are many moths which vary too. They are about, and waiting to be found!

H. R. Nevile (2027).

(a) typical (b) var. *nigra* (c) var. *polaris* (d) var. *polaris*, modified. (*but see comment*)

Comment.—Mr. Nevile's note is interesting and reveals considerable study. His classification of what he calls " varieties " is intelligent and easily understandable. I think, however, that it is now more customary to define the term " variety " as indicating a recurrent form of the various species of lepidoptera, such, for instance, as var. *valezina* of *A. paphia*; blue marked females of *L. coridon* as var. *semi-syngrapha* and var. *syngrapha* (all blue); var. *polaris* and other forms of *A. urticae* which are not uncommon when large numbers are bred; vars. *arete*, *caeca* and other recurrent forms of *A. hyperanthus* and so on. The more unusual forms which do not agree in markings and colouration are customarily referred to as " aberrations." Of the Small Tortoiseshell species, I have in my collection dozens of the ab. *nigrocaria*, all different, and most of them specifically named by the first captors. Some are marked only on the forewings (ante), others only on the hindwings (post) and some on all four wings.

Anyone who desires to specialise on *A. urticae* should read the following articles on variation and nomenclature:—

Rev. Gilbert Raynor, *Entomologist's Record, Vol. 21*, p. 4, 1909.
H. J. Turner, *Proc. South London Ent. Soc.*, 1919-20, p. 71.

I have named my own examples from these articles. Unfortunately, there are no accompanying figures, and it is by no means easy (for me at any rate) to follow verbal descriptions alone. Probably Mr. Nevile would make a better job of it than I have done; I would, however, name his specimens, which are clearly recognisable from Mr. Crotch's drawings, differently. I consider (b) to be post *nigrocaria* de Moffats; (c) ab. *connexa* Butler; and (d) var. *polaris*.

A peculiarity of this species appears to be that a pure white form has never been bred, although I have three examples, each of which was captured on the wing by a personal friend. Apparently the pigment is excessively soluble in this insect. Information about any specimens caught or bred by our members (or known to them) would be of great interest to me.

S. G. Castle Russell (119).

BUMBLE BEES (3)

(*Continued from page* 20.)

The Species. There follow descriptions of the species, illustrated by drawings of specimens. The purpose of the drawing is to give a general impression of the appearance, the exact colour pattern being given in the individual descriptions of the species.

The best way of learning to recognise the different species is to get to known first the commoner and distinct ones. The easiest to begin with are the following:—

B. lapidarius
B. terrestris
B. lucorum
B. pratorum
B. hortorum (or *ruderatus*)
B. agrorum
Ps. vestalis (or *bohemicus*)
Ps. rupestris

This list will vary with the locality, but all are generally fairly plentiful throughout the country. The species in brackets should be substituted if they are more plentiful in your district.

BOMBUS TERRESTRIS. LINN.

Genus *BOMBUS* Latreille.

BOMBUS TERRESTRIS Linn.
(The Large Earth Bumble Bee).

Size large.

Distribution
Common throughout Great Britain, in most parts the commonest species of bumble bee. In hilly northern districts maybe outnumbered by *B. lucorum*.

Descriptions

Queen
Head black.
Thorax black, with a deep yellow band anteriorly. In dark specimens this band may be obscure or absent.
Abdominal segments
1. black.
2. deep yellow.
3. black.
4. black, but tawny on posterior edge.
5. tawny.
6. tawny.

Worker
Colouring similar to Queen, but with tail white with a tawny base: smaller than the Queen.

Male
Colouring similar to Queen, but with the tail tawny white: smaller than the Queen.

BOMBUS LUCORUM. LINN.

BOMBUS LUCORUM Linn.
(The Small Earth Bumble Bee).

Size large.

Distribution
Common; outnumbers *B. terrestris* in hilly moorland districts.

Descriptions

Queen
Head black.
Thorax black, with a lemon yellow band anteriorly.
Abdominal segments
1. black
2. lemon yellow.
3. black.
4. black, but white on posterior edge.
5. white.
6. white.

Worker

Colouring resembles Queen: smaller than the Queen.

Male

Colouring very variable—from very dark to very light forms.

Dark Form

Head black.
Thorax black, with one yellow band anteriorly.
Abdominal segments
1. black.
2. yellow.
3. black.
4. black: posterior edge white.
5. white.
6. white.
7. white.

Light Form

Head yellow.
Thorax black, with anterior and posterior yellow bands.
Abdominal segments
1. yellow.
2. yellow.
3. yellow.
4. black: posterior edge white.
5. white.
6. white.
7. white.

BOMBUS LAPIDARIUS Linn.
(The Stone Bumble Bee).

Size large.

Distribution

Common throughout Britain, except for the North of Scotland; possibly commonest in milder districts.

Descriptions

Queen

Head black
Thorax black, rarely a faint anterior yellow band.
Abdominal segments
1. black.
2. black.
3. black.
4. red.
5. red.
6. red.

Worker

Colouring resembles Queen: smaller than Queen.
N.B. In this species the hairs fringing the pollen basket (*corbicula*) of both queen and worker are black.

BOMBUS LAPIDARIUS. LINN.

Male

Head black. Face pale yellow.
Thorax yellow anterior band, sometimes a trace of one behind.
Abdominal segments
1. black.
2. black.
3. black.
4. red.
5. red.
6. red.
7. red.

(*To be continued.*)

T. B. Poole (1681).

•

THE MASON WASP

In West Africa the Mason Wasp has yellow patches on the body and the legs. The wings are transparent. It frequents the banks of springs, where the soil is moist, and on a rainy day you may find it anywhere on muddy ground. Here it settles, using its forelegs to roll the moist earth into a ball of paste. This it carries off to some private corner of a room

in one's house, where it settles on the wall and uses the mud in building a cell, layer by layer, using the mouth parts at its work, plastering and humming until only a little entrance hole is left to complete.

Then the wasp goes about catching caterpillars and paralysing them with its sting. These are carried or dragged and pushed into the cell. After eggs have been laid inside the cell is closed. The grubs which hatch feed on the still-living caterpillars put there for them. Eventually they pupate and the adults pierce their way out.

In watching Mason Wasps I am struck by the likeness to our African way of building. Walls built of earthy material of this type are exposed for years to sun and rain without giving way.

Miss N. O. Ika (1423).

ORTHOPTERA GROUP

I must apologise to one or two correspondents for unavoidable delay in answering communications, but, so far as I can ascertain, replies have now been sent to all who have kindly supplied data and other information. If, however, any correspondents have *not* received acknowledgments of communications addressed to me, would they please re-establish contact at my new address (19 Green Lane, Farnham, Surrey), as I gather that, despite the usual precautions taken on moving, some mail may have been returned to senders or have gone astray.

A good deal of helpful material has already come to hand from members of the AES in response to appeals in the *Bulletin*, and from other naturalists as a result of similar appeals (concerned chiefly with distribution) in the B.E.N.A. journal, *Country-Side*, and others; a preliminary report will be compiled when analysis of this diverse and interesting information has been completed. Meanwhile, I hope that fellow-members of the Society will continue to forward data and, wherever possible, take an active part in the work of the Group. The suggestions made by Mr. H. K. Airy Shaw (545) in *Bulletin No. 124* (pp. 36-37), I think, adequately supplement previous appeals for co-operation in putting the Orthoptera well and truly on the entomological map.

As for myself, I am more than willing to co-ordinate the Group's activities and help to make its work well worth while, though I should mention that my own interest in the Orthoptera is of relatively recent origin: but perhaps this will encourage hesitant tyros to decide to participate.

Peter Michael (748).

MATING FLIGHT OF THE ORANGE TIP

On the 2nd of June 1951 I made a trip around Knowle, Hants., to collect *E. cardamines.* It was a bright sunny day with a slight south-westerly breeze. Both males and females were plentiful and I could not help but notice the courtship of this species.

A male and a female would meet in an apparently haphazard manner and the male would chase the female for some considerable distance. I had my cycle and could follow several pairs along the hedges. Eventually they started circling around each other, over and over and round and round, backwards and forwards, still circling for 15 to 20 minutes. The female would then drop suddenly to the grass, the male following. Copulation took place settled in the grass. I watched several pairs, and always the same sequence of events.

David H. Heppell (1690).

FIELD MEETINGS

The South West Yorkshire Entomological Society, Bradford, invite our members to join any of the four following outdoor meetings in typical moorland or wooded countrysides:—

May 17th. Meet near War Memorial, New Millerdam, for Chevet.
June 21st. Meet at Dakin Brook bridge, for Deffer Wood.
July 19th. Meet at Hobury Bridge, for Coxley Valley.
August 9th. Meet at Reservoir Keeper's lodge, Causeway Foot, near Halifax, for Ogden Reservoir.

These field meetings start at 3 p.m. prompt and further particulars may be had from Mr. J. Briggs (832).

FACTS ABOUT DRAGONFLIES

In her talk on Dragonflies, the substance of which appeared in the *Bulletin, Vol. 10, No. 132,* pp. 119-122, Miss Longfield expressed the opinion that, in the case of the frail Damselflies, 'it is more than doubtful if they ever migrate' in the true sense. This statement astonished me because the

vastest migrations which I have witnessed have been those of the small Pseudagrions — *decorum* Selys and *microcephalum* Rambur and *Lestes elata* Selys. The migration of these species occurs regularly and yearly in September along the west coast of India, when literally millions may be seen on the move northwards, all travelling in the same direction. These migrations have been recorded by myself in the *Records of the Indian Museum, Vol. 26*, 1924, p. 497, and in *Fauna of British India* (*Odonata*), *Vol. 1*, 1933, pp. 280 and 289, and I know as a matter of fact that Miss Longfield has both references at her elbow in the British Museum. I well remember in 1918, when on my Hospital Ship in the Bombay Docks, seeing one such migration. The ship had been freshly painted white and the swarming insects stuck to the wet paint in hundreds so that some of the deck houses looked as if they had grown a coarse kind of grass along their copings: the whole work of painting had to be done over again after scraping off the masses of Damselflies. As regards a migration in an easterly direction, I have seen one such of the large Aeshnas—*Hemianax ephippiger* (Burmeister) at Mercara, Coorg, during October 1923 (*Rec. Ind. Mus., Vol. 26*, p. 463) when large numbers were observed traversing the great divide of the Ghats which separate the West coast from the Carnatic plains in the east. The direction of these migrations and their timing are controlled by the prevailing winds, and in the tropics are invariably from south-west to north-east according to the prevalence of the two monsoons. Far from never migrating, a study of the distribution of dragonflies will show that the smaller Damselflies are the most given to migration and are the widest travellers. *Ischnura aurora*, a species far smaller than any British Damselfly, is found from the West coast of India to as far as Samoa in the Pacific ! ! : *Ischnura senegalensis*, a species which hardly differs from our British *Ischnura elegans*, is known from Senegal in West Africa as far east as the Philippines. Our little *Enallagma cyathigerum* has completed the circumference of the globe and I have taken it in England, California, Kashmir and even in the remote fastnesses of Lhassa, Thibet ! !

In the course of her lecture, Miss Longfield seems to have been guilty of a number of errors, which ought to be corrected. For example, the eggs of some dragonflies are said, by her, to be 'dropped' into water: but this is as impossible as it is inaccurate, since the batch of eggs forms a glutinous mass adhering to the two lateral gonapophyses (external processes or valves or terebra) which are the only portions of the ovipositor present in many higher forms of the Anisoptera: in fact it can be said that such dragonflies do not possess a functional ovipositor and the whole Order can be divided up into those which possess and those which do not possess an ovipositor. In the latter group, after a batch of eggs has been extruded, the insect dips rapidly towards the water and trailing the end of the abdomen along its surface, wipes the eggs from the clinging valves. This action of swift dipping and rising, to hover again for awhile to give time for another batch of eggs to be extruded, may be seen by any ordinary observer and is generally well known.

Miss Longfield spoke of a 'full-sized' ovipositor! It is clear that the ovipositor of a huge species such as *Aeshna cyanea* will be much larger than that of a small Damselfly such as *Coenagrion puella*, and I think that it is equally clear that Miss Longfield had both these species in mind when speaking of 'full-sized' ovipositors; are we then to infer that this was a *lapsus calami* on her part, for 'fully-functional' ovipositor?

This confusion of 'size' with 'function' has led to another unfortunate lapse, where the Gomphines are said by her, to 'push' their rounded eggs into mud or sand. Nothing could be further from the facts. The Gomphines, like all other dragonflies which do not possess an ovipositor, exude their eggs in batches, which they then wipe off by dipping the end of the abdomen and trailing it swiftly along the surface of the water. Gomphines invariably choose a place for ovipositing where the water is shallow and flowing swiftly in ripples over a clean gravelly bottom. In such places, the broken scintillating light reflected from the different planes of the ripples, renders the insects remarkably invisible. Moreover the shallowness of the water protects the insect from its enemies, and the swift current more easily removes the batches of eggs from the end of the abdomen as it strikes the crests of the miniature wave-like ripples, and lastly, the rush of the water carries the eggs away to safety. I have observed the act of oviposition frequent-

ly in many species of Gomphines and it has never varied from the procedure mentioned above. In tropical countries, some Gomphines lay their eggs in still waters and the females are only seen momentarily as they sweep down from neighbouring heights, swiftly lash the surface of the water with the end of the abdomen and are off again almost before you have had time to see them. They do not pause to search for a shallow where they can 'push their eggs into mud', but drop to the water well out in the middle of the ponds, a swift nose-dive followed by as swift a zoom up and out again into the sheltering jungle. Nymphs of dragonflies live 'in' water rather than 'under' water and they are not known as *nymphs* because dragonflies are hemimetabolous but because the larval stage takes place within the egg: thus the application of the term 'larva' would be a misnomer although it is often so loosely employed. Miss Longfield states that the nymphs of Zygoptera rarely swim, but one of the chief functions of their caudal gills is for swimming; if any of our young amateurs cares to breed these insects,* he will observe how rapidly they swim and dive to the bottom of the aquarium when the surface weed is disturbed. The late Dr. Tillyard wrote on some species how they dived like a flock of minnows when he disturbed the weed. Again, Miss Longfield states that some Zygopterid nymphs lie just beneath the mud. I know of none which has such a habit and all are found clinging to reeds or in the meshes of water-weed. More rarely, some exotic species are found clinging to the undersides of stones but only in torrential streams; none such are known in this country.

F. C. Fraser (890).

*In which event he cannot do better than buy *AES Leaflet No. 12*, "Collecting Dragonflies", price sevenpence halfpenny, post free.—Ed.

Rejoinder.—It is not wise to generalise on British dragonflies from experience gained abroad. I never said that *all* Gomphines (sens. lat.) "pushed" their eggs into the sand or mud; but the only two British *Gomphus vulgatissimus* seen ovipositing by me, did so, and unless these were abnormal occurrences, then how else can they be interpreted? It is *not* impossible for some dragonflies to "drop" their eggs without touching the surface of the water. Both A. E. Gardner and I have witnessed this, on separate occasions, with *S. sanguineum* in England, and I have occasionally seen other Libellulids doing the same elsewhere. When normally washed off the tip of the abdomen, the eggs "drop" through the water, as distinct from those "placed" in plants. Also to save space, I condensed "cause and effect" in the definition of "nymph". Col. Fraser is quite literally correct, but after all, "nymph" is the name applied to *all* hemimetabolous insects. I said British nymphs lived *under* water, because some exotic species do not. The Zygopterid nymphs of *Pyrrhosoma nymphula* sometimes lie just beneath the surface of the mud and much more frequently on the bottom debris than amongst weeds. When the weeds die out in the winter, the nymphs of several species descend into the top layer of the mud, it would appear from the dredging operations of both odonatists and water biologists. Certainly I should have said "fully-developed ovipositors" and not "full-sized". *Cordulegaster* has an ovipositor, modified, but fully functional. Lastly, everything turns on what is considered to be "migration in the true sense". That of *P. decorum* as lasting for two weeks, and all yearly occurrences, must certainly be "migration", but other swarms and the colonization of the Pacific Islands have not been proved to be so caused.

Cynthia Longfield (1039).

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EDITED by W. J. B. CROTCH M.A., A.K.C.

AES BULLETIN
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WINTER REST: A STUDY

Most of our British insects pass through a resting stage during the winter. Some species are inactive only during cold weather and in mild spells will resume feeding and growth without delay. In other species there is a defined dormant stage wherein development is arrested for some time and is not resumed immediately the temperature happens to rise. This latter physiological state of suspended development is known as diapause. In the Insecticides Department of Rothamsted Experimental Station a study was made of the factors influencing diapause in the Bright Line Brown Eye moth, *Diataraxia oleracea*.

In its natural state *D. oleracea* is single-brooded, but sometimes has a partial second brood in a year; it passes the winter as a diapausing pupa. By rearing in a heated glasshouse it was possible to breed several generations during the summer. Pupae formed during June and July were not in a state of diapause and took approximately 14-20 days to develop into moths (at 24° C.). Pupae formed during August and September were in a state of diapause and took from 50-150 days to produce moths (again at 24° C.). As the insect was required as a test-subject for insecticides throughout the year, attempts were made to discover if the formation of these diapausing or long-period pupae was dependent on environmental factors and not the result of some inherited rhythm. In Canada, Dickson and Saunders (1945) and Dickson (1949) had shown that length of subjection to light was important in influencing the larval diapause of the Oriental Fruit Moth, *Grapholitha molesta*.

In an experiment during which batches of *D. oleracea* larvae were reared in a constant temperature (24° C.) under differing light-lengths, larvae reared under light-lengths of 16 hours or more per 24 hours developed into short-period pupae, whilst those reared under light-lengths of less than 16 hours produced a majority of long-period pupae. Thus, by supplementing the short winter day by artificial light, short-period pupae could be obtained all the year round, a success which greatly facilitated the continuous breeding of the species.

The source of light in the experiments was the ordinary tungsten bulb, mostly of 60 watts. Experiments with bulbs of higher and lower wattages were conducted, and it appeared that intensity (above an undetermined minimum) was not of importance in influencing diapause. Sixteen hours' light from a 15 watt bulb was as effective in preventing diapause occurring as the same length of light from a 60 watt bulb.

Rearing larvae in lower temperatures tended to produce long-period pupae even under long light-lengths and conversely higher temperatures tended to produce short-period pupae even under short day lengths. At 24° C. and 30° C. larvae reared in an 8 light-hours' day developed into long-period pupae; but at a higher temperature (34° C. and the same day length) only half the pupae were of the long-period type.

By transferring larvae of different ages from long to short light-lengths and vice-versa, it was discovered that only during the later part of its life would the larva respond to the light-length. The sensitive period appears to start at some time during the "moulting sleep" (i.e. when the larva stops feeding and remains immobile until sloughing is completed) into the last instar and extends to the 3rd to 5th days of the last instar (this at a temperature of 24° C.). Once a larva has been stimulated at a suitable temperature by long light-length, the return of the larva to short light-length does not affect the consequent development of the larva into a short-period pupa. The effect of the light appears to act directly on the larvae and not through the foodplant.

There is no reason why amateurs should not make similar experiments with other species of Lepidoptera or indeed with other Orders, for the apparatus can be simply constructed and is inexpensive. The maintenance of a reasonably constant temperature

is the only tricky point. Remember that for your work to have scientific, in addition to interest, value, you must vary only *one* condition of each batch. I should like to hear of other people's results, whether successful or otherwise. What about a Diapause Study Group? I would be prepared to "lead" it.

BARBARA A. HOPKINS (827).

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OBSERVATION FROM NATAL

Early in 1951 I was able to witness the burying of a caterpillar by a species of wasp of the type of our English *Ammophila sabulosa*, although this species was about twice the size of *sabulosa*. The caterpillar victim was green and hairless, obviously lepidopterous, about the same length as the wasp but, I should estimate, three times its weight. It was gripped in the region of the thorax by the jaws alone, but was so rigidly paralysed that its body extended in a straight line underneath that of the wasp without being held by any other part than its thorax.

The interesting point was the way in which the captor completely missed the position of her prepared hole. When first seen, she was about a yard to my left, coming in a line which took her across my foot and on to a point about two yards to my right. The ground traversed was obstructed by one or two low plants and by a fallen branch. For most of the way she walked with a hurried gait, but, after climbing up any of the obstructions, she always took a short flight down to the ground. When she reached a point about two yards to my right, she turned sharply at an acute angle and proceded without any hesitation along a line which again passed in front of me, but a little further away. She then appeared to find her hole without any difficulty; but why did she make the long detour?

The hole was situated about a yard to my left front, i.e., only about three or four feet from where the wasp first came into sight. Having reached her hole she dropped her victim about one inch from the entrance, disappeared down the hole, came out again in a few seconds, seized the caterpillar by the end nearest the hole and dragged it down backwards. She re-appeared quite quickly, and proceded to fill up the hole, chiefly by sweeping the surface sand into it by backward movements of her legs, but also by deliberately picking up and dropping into it larger pieces of grit. This work did not take more than a minute or two, being completed by having the plugging firmed down by stamping with her forefeet, after which she unconcernedly flew away.

The only point in which this observation differs from Fabre's description is that in his cases in France the victim was left three or four inches from the opening while the wasp made her exploratory descent.

A. H. NEWTON (1140).

A MOSS COMMUNITY

I hope that a study which I made of a moss community on 7th January this year may be of interest to members in two ways; firstly, in proving that the coleopterist need not be idle in the winter months; and secondly to show that moss can be an interesting ecological unit in biology all the year round. In classifying the Coleoptera I have used Mr. J. R. Dibb's "Field Book of Beetles" which divides them according to their habitats; and for the Myriapoda Dr. Cloudsley-Thompson's article in the *Bulletin* which came to hand a week before my expedition.

I sallied out with a 3 lb. flour-bag and filled it three-quarters full of *Catharinea undulata*, a moss which was growing on fairly damp clay-with-flint soil by the edge of a pathway which passes through a wood at Hartly, Kent. At home, I sieved it and then pulled the turfs of moss to pieces one by one. The following animals, mostly insects, were obtained from this sample:—

MYRIAPODA—Chilopoda

Specimen 1. 38 pairs of legs, one pair of hind appendages and one pair of antennae, making 40 segments in all. Each antenna was compounded of 14 segments and each leg of 4 segments, the total length of the animal being approx. 15 mm. Very pale orange-yellow: a Geophilid.

Specimen 2. 14 pairs of legs and 14 body segments, 16 segments in all. Each antenna compounded

of 25 segments, legs 4 segments, and hind appendages 6. Overall length about 12 mm. Pale brown with darker brown head: a Lithobiid.

Specimen 3. Another Lithobiid, with antennae having 42 segments, but otherwise like no. 2. Segments black, with dark brown between them, same as the head. On this specimen were two ectoparasitic mites of a size just visible to the naked eye. Through a lens they could be seen to be well adapted to the parasitic mode of life by the numerous spines on the body and appendages, and also by the claws at the extremity of each leg. Both parasites were very active and at the time of examination were near the animal's head.

Specimen 4. A Lithobiid of length only about 5 mm. Yellowish, but darker intersegmentally, and with dark brown head.

COLEOPTERA

Carabidae. One larva.
Harpalinae. *Bradycellus sharpi.*
Amara lucida.
Feronia nigrita.
Staphylinidae. Oxytelinae.
Oxytelus laqueatus.
Trogophloeus arcuatus. (Many.)
Aleocharinae.
Ilyobates nigricollis.
Ocalea picata. (Many.)
Cryptophagidae. Atomariinae.
Atomaria spp. Several oval, light brown, length 1 mm. and others black, about three-quarters the length.
Curculionidae. Otiorrhynchinae.
Otiorrhynchus ligneus.
Curculioninae.
Miccotrogus picirostris.

HEMIPTERA. Several green wingless Aphids.

DIPTERA.

Trichoceridae. I took several winter gnats which had settled on the moss at 5.15 p.m., the day having no wind and being mild.

LEPIDOPTERA.

Selidosemidae. *Theria rupicapraria* (Early Moth). Settled on the moss.

In addition to all the above, there were two species of spiders, numerous soil Nematodes and three earthworms; some small mites (probably Red Spider Mite) and two caterpillars which I have not been able to identify.

On a different subject, I would like to draw the attention of members again to the "Blues Group" (see *Bulletin, Vol. 10, No. 127,* p. 82), which has not as yet received enough support to carry out any significant work.

G. E. Scudder (2032).

NOMENCLATURE AGAIN

Dear Sir,—In the February *Bulletin* (p. 11) Prof. Grensted says he *must* use *Crocota* Huebner and not *Aspilates* Treitschke (I misspelt it *Aspitates* and both Mr. Benson and Prof. Grensted misspelt it *Aspidates*) because *Crocota* is earlier. *Crocota,* published in Huebner, "Verz. bek. Schmett.," 1823, p. 295, was used for two species only, no. 2857, *tinctaria* Huebner and no. 2858, *prunaria* Linn.: *gilvaria* was not mentioned although it was known to him. *Tinctaria* is a synonym of *lutearia* Fabricius. Prout used *Crocota* for three peculiar alpine species, *lutearia* Fabr. (*tinctaria* Hübn.), *niveata* Scop., and *peletieraria* Dup., correctly rejecting the later generic name *Cleogene* used by Staudinger for the same three species.

If Prof. Grensted considers that *gilvaria* is congeneric with these, he is right in placing it in the same genus *Crocota*, but Prout and most other authors do not consider that it belongs to the same genus and quite correctly have used the earliest available genus, *Aspilates* Treitschke. Prof. Grensted, by not explaining why he himself *must* use *Crocota,* may have misled Mr. Benson into thinking that he too *must* use it. This is not so. Mr. Benson, if he wishes, can go on using *Aspilates,* and can justify this by saying that in his opinion the structural differences between the imago and larva of the three alpine species and those of *gilvaria* are too great for them to be placed in the same genus. He will not break the International Rules of Zoological Nomenclature by this action.—Yours faithfully,

E. A. Cockayne
(Honorary Member).

Dear Sir,—I sympathise with Mr. R. H. Benson's difficulties with Latin names and appreciate the Rev. Prof. L. W. Grensted's comments. I would like to suggest with

due respect that there *is* a Latin-English dictionary for scientific names—"An Accentuated List of the British Lepidoptera with hints on the derivation of the names," published in 1858 by the Entomological Societies of Oxford and Cambridge. Though many of the names listed have now been superseded this little book does throw some light on the subject. Even a hundred years ago there were some strange anomalies. For instance: *Thecla rubi, pruni* and *quercus.* Am I wrong in saying that the first two trivial names are in the genitive case, suggesting the Thecla "of the bramble," "of the blackthorn"? Then why not *querci* "of the oak"? But, I implore the powers that be, do not alter it! The recent change of *Colias croceus* to *crocea* is carrying grammatical Latin too far into the realms of scientific usage and renders confusion worse confounded. The above-mentioned book can be bought second-hand quite cheaply; a modern edition would be of little help, because, as Professor Grensted said, even anagrams are resorted to now in order to provide unprecedented names.—Yours faithfully,

JOHN E. KNIGHT (94).

COMMENT.—The genitive of *quercŭs* (short *u*) is *quercûs* (long *u*), and whenever this word is used as a specific name it is, in fact, in the genitive case, and should be pronounced accordingly. *Quercus* is one of the compartively small number of Latin nouns ending in *-us* which belong to the *fourth* declension, not to the second (or third).

I am duly shocked at Mr. Knight's suggestion that it is possible to "carry grammatical Latin too far into the realms of scientific usage." What fun it would be if we had to look up every scientific name to see whether the epithet *should* or should *not* agree with the genonym, and, if the latter, just *how* it should *disagree*! Would he extend this principle to French or German, when used as a means of scientific communication?!

H. K. AIRY SHAW (545).

OBSERVATIONS AND QUERIES

MR. S. GENT (2030) wonders if other members have observed the relations or conduct between one species of *Psithyrus* and another. He writes:—"I placed a *Bombus lucorum* in a large glass with suitable flower heads. I then placed a *Psithyrus bohemicus* with it to test for reaction. Nothing happened. I placed a second *bohemicus* inside; again nothing. All probed happily at the flower head. Next I introduced a *Psithyrus barbutellus. Barbutellus* completely ignored the *Bombus* female, but flew like a tiger at the nearest *bohemicus* which tried to escape. A rough and tumble followed, with *bohemicus* attempting to break away and finally doing so, getting to the other end of the glass pretty smartly. Then *barbutellus* got hold of the other *bohemicus* female and a really fierce fight started; but neither attempted the use of the sting. *Bohemicus* broke away and joined her companion at the far end, but *barbutellus* followed and hounded both, biting their wings and legs, while they tried desperately to escape her. Why should *barbutellus* be so spiteful to *bohemicus,* their hosts being different?

MR. J. B. OGDEN (1580) states that he, like Mr. Holroyd (see *Bulletin, Vol. 11, No. 134,* page 13), has had butterfly chrysalids "lying over." He writes:—"In 1950 I obtained some first brood larvae of *Pieris rapae,* all of which pupated in the normal way. Except for one chrysalis, all emerged as normal second-brood insects. The remaining chrysalis was kept through the winter and emerged the following spring. This insect possessed the lighter markings of a first-brood insect. It will be interesting to see what the markings of Mr. Holroyd's specimens will be like when they emerge.

"I also had two *P. napi* second-brood insects that wintered, skipped the first-brood period of emergence, and duly appeared as butterflies at the same time as second-brood imagines in the wild state. The markings of these two insects were the markings of second-brood imagines.

"I would add, without comment, that all three specimens were females."

MR. P. H. HOLLOWAY (429) records that 23 out of 24 *P. brassicae* larvae, which he took, when full-fed, from Brompton Stock and Nasturtium last October, were parasitised by the Ichneumon *Apanteles glomeratus.*

R. W. J. UFFEN (1660*) says that *Laothoë populi* and *Smerinthus ocellatus* were the only two species which escaped from parasites in his locality last year (London, W.6),

though the latter was badly attacked not a mile away.

With reference to Mr. Benson's note on cannibalism in *Apatele megacephala* (*Bulletin, Vol 10*, p. 113) he reports rearing over a dozen larvae in a 5-lb. sweet-tin without trace of this nasty habit.

A. E. Smith (2053*) has noticed the remarkable growth in size of the many colonies of Magpie Moth (*Abraxas grossulariata*) near Bradford. " One of these colonies is in a neighbour's garden and on July 1st, 1951, I took a score or so pupae. I was surprised and delighted when on July 9th a var. *varleyata* emerged, followed by another on July 16th. Thus encouraged, I examined all the specimens on the garden fence by the gooseberry bushes from which I had taken the pupae and found another one.

I understand that this variation originated from this part of the country some 40 years ago. Speaking to the local entomologists, I can find no one who has been breeding *varleyata*.

Does anyone know of any other truly wild Magpie Moth var. *varleyata* being found during recent years?"

Mr. H. W. Daltry (972) adds a footnote to his note on " Assembling in the Hymenoptera " (*Bulletin, Vol. 11*, p. 18): " I do not seem to have made it clear, as I had intended to do, that both sexes were present in the swarm of *Chorinaeus cristator* Grav. Those I brought home consisted of five males and three females."

Mr. A. W. Jones (1165) reports: " On 8th March 1952 I observed a Painted Lady (*Vanessa cardui*) on Coltsfoot (*Tussilago farfara*) and flying (less vigorously than usual) on Wimbledon Common (London).

The specimen was on inspection found to be in good condition. Presumably it had overwintered, as it was much too early for immigrants (the weather in any case not being very favourable about that time).

South says ' the butterfly, so far as is known, does not hibernate as do the Tortoiseshells and the Peacock.' Sanders bluntly says ' No survivors through the winter.' "

Mr. Denis F. Harle (889) and Mr. B. R. Thomas (1709) also report the presence of *V. cardui*. The former saw a male near Canterbury on 4th March and three more on 16th March at Sandwich Bay, Kent. The latter saw two near Carmarthen on 9th March and others at intervals to 22nd March, when six were in evidence at the same time.

[*March 23rd is the average date of arrival for the past 20 years, but, as reported in* The Times, *the Painted Lady was seen on March 2nd near the South Coast, and a total of 187 had been reported to Captain Dannreuthar by March 12th. South and Sanders may be regarded as having survived Mr. Jones' challenge.*—Ed.]

HOLIDAY COLLECTING

On my summer holidays at Vevey on the Lake of Geneva last year I noticed many Lepidoptera which are seldom seen in Britain as well as several which are more common with us.

Among the vines I discovered several Scarce Swallowtails (*Papilio podalirius*) and the commoner Swallowtail (*P. machaon*), several of which I caught for my collection. There were also numbers of Pale Clouded Yellows (*Colias hyale*) and Wood Whites (*Leptidea sinapis*) in the fields. Brown Hairstreaks (*Thecla betulae*) were to be seen sunning themselves on the surrounding blackthorn hedges.

Wherever there was a collection of trees, either a wood or a copse, White Admirals (*Limenitis camilla*), Purple Hairstreaks (*T. quercus*) and Purple Emperors (*Apatura iris*) were to be seen, although the last were difficult to see and identify because they spent most of their time above the loftiest oaks and elms. Meadow Browns (*Maniola jurtina*), Holly Blues (*Celastrina argiolus*), Dingy Skippers (*Erynnis tages*) and Marbled Whites (*Agapetes galathea*) abounded everywhere; and many moths of the Carpet family could be disturbed from their resting places among the long grass.

On a journey by car up a very steep mountain I spotted an enormous variety of butterflies in all the little glades among the tall larch trees which lined the road. About three miles from St. Martigny we stopped the car and I sprang out, net in hand, to catch a Large Copper (*Lycaena dispar*), one of the Fritillary family and a Scotch Argus (*Erebia aethiops*) in three minutes. Unluckily I could not revisit this lepidopterist's paradise, as it was at least twenty miles from where I was staying.

Richard Brock (2015*). Age 12.

"SHOCK TREATMENT" FOR PUPAE

Seeing that the effects of shocks and kindred stimuli on pupae have from time to time received notice, the following incident may be of interest.

During 1950 I was rearing *Mamestra brassicae* and other species in connection with research concerning larval colours. On the night of June 11th, 1951, the first imago resulted from a batch of ova found on August 9th, 1950. No further emergences were noted during the ensuing few days, but on the afternoon of June 17th, 1951, I returned from a short outing to find my wife in apologetic mood and five cabbage-moths, instead of one only, in the jar.

It seems that the container, which had been left near an open window, was either knocked or blown over, the contents being badly shaken up. My wife was quite certain that there had been only one moth in the jar just prior to this accident, for she remembered having taken a peep at the jar; when I left the house there was certainly only one, for I had "made a round of" my cages and what-not.

Examination revealed five empty pupa-cases, but no further pupae: these further four imagines, therefore, must have emerged simultaneously, more or less, after receiving their "shock treatment". Suggestion: if you want to hasten the emergence of your live stock, try knocking them around a bit.

PETER MICHAEL (748).

•

BUMBLE BEES (4)

(*Continued from p. 29*)

BOMBUS HORTORUM Linn. (The Small Garden Bumble Bee).

Size medium.

Distribution

Widely distributed and common in most districts, especially in northern regions.

Descriptions

Queen

Head black.
Thorax black, with a broad yellow band in front and a slightly narrower one behind.
Abdominal segments
1. yellow.
2. black; yellow anteriorly.
3. black; frequently white posteriorly.
4. white.
5. white.
6. black.

Worker

Colouring resembles the Queen: smaller than Queen.

Male

Head black, yellow on top.
Thorax black, with broad yellow band in front and narrow one behind.
Abdominal segments
1. yellow.
2. black. Yellow anterior middle region.
3. black.
4. white.
5. white.
6. white, black in middle.
7. black.

N.B. This species may be distinguished from similarly coloured *B. jonellus* by the long face and black hairs fringing the corbicula.

BOMBUS HORTORUM. LINN.

BOMBUS RUDERATUS Fabr. (The Large Garden Bumble Bee).

Size large.

Distribution

Commonest in the South of Britain, where it tends to replace *B. hortorum*: absent from the North of Scotland.

Descriptions

Queen

Great variations in colour due to melanic tendencies; light specimens resemble the Queen of *B. hortorum* to which this species is very closely related. Constant differences between light specimens of this species and *B. hortorum* are:—

1. Yellow bands on the thorax of equal width.
2. Yellow band on segment 1 of abdomen often interrupted in the middle by black; yellow does not spread on to segment 2.
3. Face slightly shorter than in *B. hortorum.*

Melanic queens

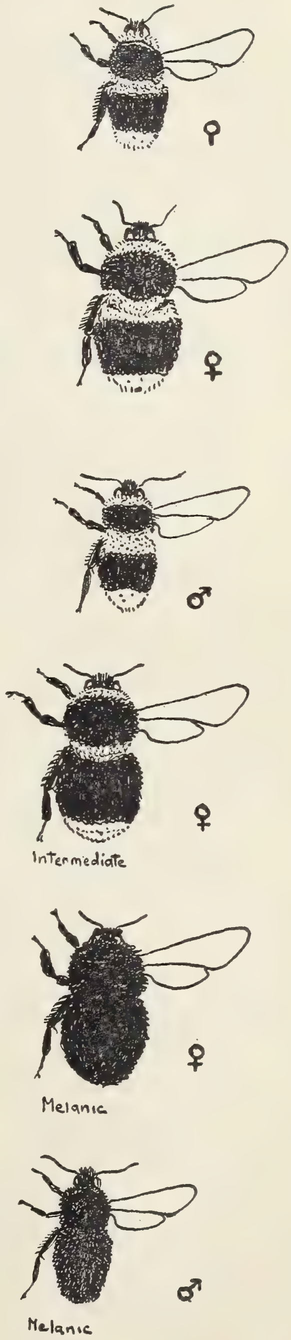
The darkest specimens are completely black. Intermediate specimens occur, in which the yellow becomes dingy and the band on the abdomen has disappeared; in other specimens the yellow bands on the thorax have also become very narrow and the tail is brownish. The intermediate melanic specimens may resemble *B. subterraneus*, but the two yellow bands on the thorax are always of equal width. In *B. subterraneus* the posterior band is always narrower.

Worker

Resembles Queen in colouring; all-black specimens are found, but intermediate specimens are rarely seen: smaller than Queen.

Male

Light specimens resemble male of *B. hortorum*. Differences are:—1. Bands on thorax of equal width. 2. Sides of thorax yellowish (black in *hortorum*).



BOMBUS RUDERATUS FABR.

Melanic males

May be completely black, while intermediate specimens do occur.

(*To be continued*) T. B. POOLE (1681)

COLLECTOR—OR ENTOMOLOGIST?

I know lots of good collectors: I also know lots of good lepidopterists and a few good entomologists. I know too a number of " bad collectors." There are *no* bad lepidopterists or entomologists! It sounds a bit of a mix-up; but is it?

Anyone can collect. I hear a voice from afar saying, " Why shouldn't I?" Of course, you should; collecting plus observation must be the foundation to all entomological knowledge: but a collector has no right to call himself a lepidopterist or entomologist on that score alone, for the " collector " simply knows his insect by shape and design and is often very good at perusing a label-list, or comparing his insects with the illustrations in a reference book.

The whole point is, what do we know about our insects in the way of distribution, early stages, food-plants, origins, and all the other (even elementary) facts which are not always obvious? Do we ask ourselves, why is such, or why is so and so? Do we carefully save those plaguey parasites and record all the data we can so easily secure? If we do, then we are beginning to pass the elementary, or " collector," stage, and will, with much study and practical work, eventually graduate into the very desirable stage known as " a lepidopterist," " a hymenopterist," and so on. Then, after many years of careful work and study, we may perhaps one day be called " an entomologist." What a thoroughly sound ambition, indeed, and how few ever achieve this goal.

Last summer I met a boy with a net and, on enquiry, was told he collected butterflies. I asked his object. He said: " They are pretty." Has he the right to collect? Of course he has, it is his hobby, and helps to make his life joyful. Another youngster I know better catches moths, secures ova, breeds his series, and is keen on selective pairing. He will be *at least* a good lepidopterist.

The stamp-collector knows his watermarks, perforations, dyes, plate numbers, printers, and the rest. How much more is it necessary for the entomologist to know the secrets of his living subjects than for a student of inanimate things like stamps. Entomology is a study of Life and a cabinet of set insects is merely ancillary to the subject.

H. E. HAMMOND (423).

REVIEW

Name this Insect by Eric Fitch Daglish; pp. 384, 16 colour plates, 48 half-tone plates and over 100 line drawings. J. M. Dent and Sons, London; 1952; 15/-.

This is the book for the teacher who is expected to identify the grub brought to school in a matchbox or for the ordinary member who cannot afford or has no intention of acquiring a reference library to cover the Orders in which he does not specialise. By a chain of selections between alternative characteristics, the user can track down in a very short time the beastie he is curious about. Your reviewer tried the publication out on three beetles, three ants, three flies and a couple each of dragonflies, butterflies, moths and Neuroptera. It worked. Moreover, when you have identified your insect, you find a sentence or even a paragraph about its points of interest.

The Foreword makes it clear that rare or very local insects and those less than ¼" long have been excluded. The purchaser should also understand that larval or nymphal forms, such as the immature Ladybird or the Sawfly larva, would remain unsolved mysteries, as would that common London curiosity the wingless female of the Vapourer moth. (If you know what it is, you can find it in the text, but not described!)

The plates are in general good and helpful, although the choice of insects on them has definitely not been limited by the textual criteria: at least a couple of the beetles are unlikely to be seen in half a lifetime. The scientific names are, alas, not always what they should be and the author has used or invented English names for a good many insects that have never acquired them in common parlance. Does it really help to refer to the Greenweed Centrotus (*Gargara*, misnamed *Centrotus, genistae*), the Margined Syromastes (*Coreus marginatus*, misnamed *Syromastes marginalis*), or the Beautiful Gnorimus (*G. nobilis*)? Even Mr. Daglish is baffled by an occasional name, e.g. *Creophilus maxillosus* among the Beetles and *Lygaeus equestris* among the Bugs.

J. C.

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AES NOTICE
WHERE TO WRITE

Applications for new membership; offers to help with AES work; Exchange Notices to: E. LEWIS, *8 Parry Road, London, S.E.25. (Wants and Exchanges Lists are circulated in March, May, July and October and notices must be received by the 15th of the previous month.)*

Advertisers to: L. W. SIGGS, *10 Repton Road, Orpington, Kent.*

Non-arrival of Bulletins *and changes of address should be reported to*: B. L. J. BYERLEY, *48 Elmgrove Road, Harrow, Middlesex.*

Offers to lead Field Meetings, exhibit, etc., to: K. H. BOBE, *19 Hengist Road, London, S.E.12.*

Manuscripts, drawings and books for review to: W. J. B. CROTCH, *5 Stanley Crescent, London, W.11.*

Subscriptions (12/- per annum, 6/- for Juniors) to: P. C. LE MASURIER, *85 Warren Drive, Tolworth, Surrey.*

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EDITED by W. J. B. CROTCH M.A., A.K.C.

AES
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ANNUAL GENERAL MEETING

The Annual General Meeting was held, by courtesy of the Linnean Society, in their rooms at Burlington House on the afternoon of Saturday, 29th March 1952. It was preceded by a conversazione and an interesting film show.

As a result of uncontested elections the AES Council for 1952-53 is constituted as follows:—

President: A. N. Brangham (18).

Vice-President: B. L. J. Byerley (788).

Vice-President and Publicity Secretary: L. W. Siggs (243).

General Secretary: E. Lewis (952).

Treasurer: P. C. Le Masurier (978).

Editor: W. J. B. Crotch (1181).

Meetings Secretary: K. H. Bobe (912).

Youth Secretary: R. G. Shaw (1486).

Councillors: W. B. Broughton (1632), L. C. Bushby (1075), B. A. Cooper (19), S. M. Hanson (320), C. H. Ison (1343), N. A. Lockington (1421), C. B. Pratt (784), H. K. Airy Shaw (545), and T. R. E. Southwood (1051).

The General Secretary presented the Council's Report, which is printed below. The Treasurer's Report will be circulated in a later issue of the *Bulletin*, when the accounts have been audited. The President expressed the Council's gratitude to those many members who had added donations when sending their subscriptions. In particular were they grateful to the Hon. R. Gerard (359) for a gift of £20.

The incoming President announced that one subject of study for the new Council would be the bye-laws of the Society. It was hoped to re-draft these to remove certain inconsistencies and anomalies. A Special Meeting of the Society would be called to discuss the subject in the autumn.

The meeting concluded with an animated discussion of the Society's publications and members' ideas for developments in the Society's activities.

COUNCIL'S REPORT FOR 1951

In 1951 the AES succeeded in maintaining its position in the face of the steady rise in costs throughout the year. The *Bulletin* appeared regularly on the first of each month. The 1948 Journal was published and copies were sent free to members who had subscribed for that year. Four new Leaflets and one Pamphlet were also issued.

During the year 206 new members joined the Society, but losses (through resignation, failure to pay the subscription after repeated reminders, and deaths) reduced this to a comparatively small net increase. The membership at the 31st December was 943, compared with 890 at the end of 1950. Most new joinings were the result of recommendation by existing members, particularly through the encouragement of the Publicity Secretary's Recruitment Drive.

With present-day costs, the financial position of the Society gives some concern. As members have been reminded in previous years, in such circumstances the only alternative to increased subscriptions is a substantial addition to membership, and members are urged to re-double their efforts in this direction during 1952.

The Annual Exhibition held in September was the most successful for several years, and the Society's thanks are due to the Meetings Secretary for its efficient organization. It is hoped to hold future Exhibitions about the same time each year, and that this will result in their receiving continued and increasing support from members.

The Study Groups, which now number ten, were active during the year. Although they were still in the stage of gaining new members and collecting data, they made good progress, and should soon show valuable results of their activities.

The Council met six times during 1951; the average attendance at meetings was 12. An additional, unofficial meeting was combined with a field meeting and took place in a barn during a thunder-storm!

E. Lewis, General Secretary.

dung. *H. stercorarius* Deg. larvae are distinctive in that they have no sclerotised hooks at the end of the abdomen and these larvae live in cow dung at a later stage of decomposition. *Metriocnemus subnudus* Edw. larvae are recorded from humus[7]. *Hydrobaenus nidorum* Edw. was so named because it was bred from a bird's nest. *H. furcatus* Kieff. is occasionally reported as damaging plants and I have had larvae apparently of this species from failing young bean plants.

Lastly the larvae of the Clunioninae live in rock pools by the sea, feeding on algae[2]. Little seems to be known about the length of life of the adult. The tides cover the habitat twice a day and one theory is that the adult shelters in rock crevices when the tide is in.

The range of larval habitat is, therefore, very wide and feeding habits consequently very variable. Of the 400 British species I can trace less than seventy species which have had the larval habits recorded. There thus is a vast field for research into the habits of the midges, most of which seem to be quite easy to rear. The greatest difficulty, however, is not breeding but determining the adults afterwards. A little patience, and moderation in describing species as new, goes a long way.

The following bibliography contains the references in the text, and these works also review most of the literature on Chironomidae and related matters.

1. Kloet, G. S. and Hincks, W. D., 1945, *A Check List of British Insects*, Stockport.

2. Coe, R. L. *et al.*, 1950, Handbooks for *the identification of British insects*, **IX**, Pt. 2, Nematocera.

3. Gibson, N. H. E., 1945, On the mating swarms of certain Chironomidae (Diptera), *Trans. R. ent. Soc.*, **95** : 263-294.

4. Edwards, F. W., 1929, British non-biting midges (Diptera, Chironomidae), *Trans. R. ent. Soc.*, **77** : 279-430.

5. Freeman, J. A., 1945, Studies in the distribution of insects by aerial currents, *J. anim. Ecol.*, **14** : 128-154.

6. Goetghebuer, M., and Lenz, F., 1937-1944, Tendipedidae (Chironomidae), in Linder : *Die Fliegen der Palearktischen Region*.

7. Strenzke, K., 1950, Systematik, morphologie und ökologie der terrestrischen Chironomiden, *Archiv f. Hydrob., Suppl.-Bd.*, **18** : 207-414.

8. Morgan, M. J., 1949, The metamorphosis and ecology of some species of Tanypodinae (Dipt., Chironomidae), *Ent. mon. Mag.*, **85** : 119-126.

9. Thienemann, A., 1944, Bestimmungstabellen für die bis jetzt bekannten Larven und Puppen der Orthocladiinen (Diptera Chironomidae), *Archiv f. Hydrob.*, **39** : 551-664.

10. Walshe, B. M., 1951, The feeding habits of certain chironomid larvae (subfamily Tendipedidae), *Proc. Zoo. Soc. Lond.*, **121** : 63-79.

11. Wesenberg-Lund, C., 1943, *Biologie der Süswasserinsekten*, Copenhagen.

B. R. LAURENCE.

A SIMPLE EXPERIMENT

Professor Doris Mackinnon, in her book, "The Animal's World,"* refers to the reactions of caterpillars of Cabbage-White Butterflies to the blowing of a whistle near them. They rear up as though disturbed. It seems that the response is due, not to hearing in the normal sense of the word, but to the vibrations shaking the tiny hairs of the larva. Dr. Baier, who made the initial experiments, found that when the caterpillar was wet and the hairs stuck to its body, no reaction was evoked by the loudest blasts.

This is a simple experiment which is worth repeating, using an ordinary whistle, an "inaudible" dog-whistle and perhaps a tuning fork to discover whether there is a limiting pitch which can be recognised. In making the tests, it will be important to ensure that the larvae are feeding or resting normally before the sound-making begins; and that the disturbance shown is not due to different causes, such as one's shadow falling across them or vibrations from touching the cage or table which they are on. One will also have to look out for diminishing effects of familiarity, if the same caterpillars are used frequently or too much.

It would be interesting if the notes giving rise to reactions in the caterpillar were near to those produced by the wing-beats of marauding ichneumons or parasitic flies. Perhaps some of our affiliated schools will organise a few trials with common larvae of varying degrees of hairiness and report the results for publication in the *Bulletin*.

*A second, revised edition of which was published by G. Bell and Sons, Ltd., last year.

BUMBLE BEES (5)

(*Continued from p. 40*)

BOMBUS SUBTERRANEUS Linn.
(Short haired Humble Bee).

Size large.

Distribution
Commonest in South and East of England.

Descriptions

Queen

Head black.
Thorax black, yellow band anteriorly and a very narrow one behind.
Abdominal segments
1. black, occasionally yellow.
2. black, faint white band on anterior edge.
3. black, yellowish white band on anterior edge.
4, 5. white.
6. black.

Worker

Resembles Queen in colour but yellow band behind thorax is often absent and the yellow band on the abdomen is seldom present.
The above may be distinguished from *B. ruderatus* by the following characteristics:
1. Anterior yellow band on thorax always broader than the posterior one.
2. Face slightly shorter.
3. Hair shorter.

Male

Head black, with some yellow.
Thorax dull yellow, with a black band between the wings.
Abdominal segments
1. dull yellow.
2. black, with dull yellow posterior margin.
3. dull yellow, with a black anterior margin.
4, 5. dull yellow.
6. dull yellow, black in centre.
7. black.

Note: The black bands on segments 2 and 3 may be reduced or absent. There are always a few black hairs on the sides of segment 2.

BOMBUS SUBTERRANEUS. LINN.

BOMBUS CULLUMANUS Kirby.
(Cullum's Humble Bee).

Size medium.

Distribution
Only a few males of this species have ever been found in Britain, and these in the South and Midlands.

Descriptions

Queen and *Worker*
No British specimens known.

Male
The males found in this country resembled the light male of *B. ruderarius* in colour. They differ in that the sixth to twelfth joints of the antennae are not swollen behind but all the segments of the flagellum are slightly arched.

BOMBUS POMORUM Panzer.
(Apple Humble Bee).

This species is common on the Continent, but it is doubtful whether it should be included in the British list.

BOMBUS DISTINGUENDUS Morawitz.
(The Great Yellow Humble Bee).

Size large.

Distribution
Uncommon, but commonest in the North of Britain.

Descriptions

Queen

Head dull or greenish yellow mixed with black.
Thorax dull or greenish yellow with a blackish band between the wings.
Abdominal segments
1. dull yellow.
2. deeper yellow.
3 to 6. dull yellow.

Worker

Resembles Queen in colouring but smaller in size.

Male

Resembles Queen in colouring.
Differs from Male of *B. subterraneus* in absence of any black hairs on segment 2.

BOMBUS DISTINGUENDUS. MORAWITZ.

BOMBUS SOROENSIS Fabr.
(Ilfracombe Humble Bee).

Size small.

Distribution
Local species found in many scattered localities in Britain. Distribution probably needs much more investigation.

Descriptions

Queen

Coloured like *B. lucorum*.
Differs in following characteristics:
1. Yellow band on abdomen generally broken or extending on to the sides of segment 1.
2. Head slightly narrower and coat shorter.

Best distinguished by genitalia.

Worker

Resembles Queen in colouring but tail may be tinged with red at base.

Male

Head black, may be some yellow on top.
Thorax black, with yellow anterior band.

BOMBUS SOROENSIS. FABR.

Abdominal segments
1. yellow but usually black band anteriorly.
2. yellow.
3. black.
4 to 7. white (may be red at base).

Differs from Males of *lucorum* and *pratorum* in:
1. Hind metatarsi not parallel sided but tapering to base.
2. Antennae, third joint shorter than fourth in *soroensis;* third longer than fourth in *pratorum;* third joint longer than fourth in *lucorum*.
3. Genitalia distinct.

(*To be continued*).

T. B. POOLE (1681).

DWARF IMAGINES

There have lately been two descriptions of these dwarfs, one by Mr. P. H. Holloway (*Bulletin* Vol. 10, p. 85) and one by Alan D. Kindred (*ibid.*, p. 116). In each of these cases there was early emergence in a warm room. Quite recently Mr. R. H. Benson (*Bulletin*, Vol. 11, p. 24) mentions having taken a dwarf specimen of *Pieris napi* (Green Veined White) on 12th May 1948 and also having bred one of *S. populi* (Poplar Hawk) in an unheated room; this room, however, would be warmer than the outside air. It would be interesting to know whether emergence, earlier than normal, either in a room warmer than the outside air (and probably much drier), or in an earlier than usual spell of warm, dry weather outside, is conducive to the production of these dwarf specimens, when the larvae have been reared on their usual food plants. Possibly the dryness of the pupae may have some effect.

Over several years the following dwarf specimens, amongst others, have been taken: —

		mm.	mm.		District	Date
1. *Pieris napi*	♂	31.5	(43)	1. Green Veined White	S. Devon	28/3/1933
2. *Eumenis semele*	♀	40.0	(52.5)	2. The Grayling	Gt. Orme	20/7/1938
3. *Polyommatus icarus*	♂	20.5	(30.5)	3. Common Blue	Sussex	18/6/1937
4. *P. icarus*	♀	19.0	(31.5)	4. Common Blue	S. Devon	6/8/1938
5. *Smerinthus ocellatus*	♂	64.0	(88)	5. Eyed Hawk	S. Devon	17/6/1942
6. *Phalera bucephala*	♂	37.0	(55.5)	6. The Buff Tip	S. Devon	27/6/1936
7. *Alcis rhomboidaria*	♂	30.5	(38.5)	7. Willow Beauty	Salop	26/7/1930
8. *Mormo maura*	♂	51.0	(61)	8. The Old Lady	Salop	26/7/1930
9. *Hydraecia micacea*	♂	30.0	(40.5)	9. Rosy Rustic	Flints	7/9/1947
10. *Rhizedra lutosa*	♂	36.0	(45)	10. Large Wainscot	Delamere Forest	7/9/1947

Bracketed numbers give the average size. All were captures except *S. ocellatus*, which emerged on the above date; its larva was fed on willow. All were perfect specimens.

On the other hand, a very large specimen of *Hepialus humuli* ♀ (The Ghost Moth) measuring 67.0 mm. across the forewing tips (normal size 51.5 mm.) was taken in the light trap (100 Watt. bulb) here on 17/7/1951.

H. HENSTOCK (209).

BEES THAT CARRIED ARSENIC

"Extraordinary circumstances associated with the discovery of arsenic in honey," according to a provincial paper, "were revealed in a report made under the Food and Drugs Act" to a rural district council. A beekeeper observed abnormal discoloration during the heating of some beeswax following the running of honey, and on analysis the wax was found to contain arsenic. "Several 1 lb. pots of honey were submitted to analysis and also found to contain the minimum permitted quantity of one-hundredth of a gram, but the analyst was dissatisfied that he had obtained a fair sample of the whole stock, and therefore unable to give an opinion."

"Following investigations," proceeded the report, "it was found that a sweetened arsenical compound was used in the roof of a cottage as a rat poison and left. It was found by the bees and carried to the hive. Until the source of the arsenic and the amount was known, it was necessary to know the addresses of all other beekeepers in the district and to take precautionary action. With the finding of the source . . . it reduced the risk of contamination to a limited area, and concluded the inquiries."

The writer—who is not an apiarist—would be interested to hear of any comparable instances.

PETER MICHAEL (748).

THE BLUES GROUP

Although the membership of the group is still small, I feel a brief report of last season's activities should be recorded. Members residing in Lancs., Co. Durham, Devon, Essex, Isle of Man, Kent, Cheshire, and Sussex, have sent me many interesting letters with much information. Data collected from such a wide area is very helpful but cannot be conclusive unless a wider coverage of Britain is made, and I do urge any AES member to come into the group, even if partially interested in the Blues. I realise that those living in the south in favoured Blue localities are naturally more likely to become ardent followers of this fine race of insects, but it is those living in the north, where only two or three species can be found, who can give vital information on distribution.

Discussion has mainly centred on *Polyommatus icarus.* It is found that times of emergence vary considerably. I will give a detailed analysis of recordings in the future. It appears that *P. icarus* gradually becomes less likely to be double brooded as you travel north (with some variation), so that in the northern counties of England the second brood is only partial, or in bad seasons is completely absent. Information from Northumberland and the Scottish counties just over the Border would be particularly welcome.

It seems that the status of *P. icarus* in N.E. Durham is very similar with that in S. Westmorland. In these counties the first emergence is in late June or July with a very small second brood, sometimes absent, of small sized butterflies in late August and September. In W. Cumberland, however, although several miles north of S. Westmorland, the species is definitely double-brooded and there is not such a difference in size between the first and second broods. The first brood appears in May or June and the second brood in July, while the first brood in S. Westmorland is still on the wing.

The Rev. J. H. Vine Hall (1520) considers there is some difference in the blue scaling of the females from W. Cumberland and S. Westmorland. In the former county first brood females tend to be brown and dull and second brood heavily scaled with blue, while in the latter county the reverse appears to be the case. I find in Sussex the first brood is usually by far the brighter and more blue scaled than the second or third broods.

Mr. T. W. Jefferson (242) has kindly sent me some first brood specimens from N.E. Durham. They are much larger and brighter in colour than southern forms, and lead me to the conclusion that the later the first brood appears, the larger the insect and the deeper and brighter the blue; although I have some *icarus* from W. Cornwall which are much larger than those from the home counties. They were caught on the Lizard, and closely resemble the Isle of Scilly race.

I hope it will be possible to obtain records from all counties. Would members willing to help please make notes and send them to me in the autumn. Your help will be really appreciated.

Has any member visited Lundy Island? Are there any *P. icarus* there?

I hope to exhibit *P. icarus* at the annual exhibition this year, giving examples of geographical distribution.

Another species well worth watching is *C. argiolis* because, judging by recent records, it appears to be spreading.

L. coridon was taken in Devon in 1951 by Mr. Read. He also took a fine ♂ variety of *coridon* at Swanage; it is cream in colour and devoid of any black marking on the upperside, resembling variety "lacticolor."

R. C. Dyson (91).

INSECT PROTECTION

The Protection Committee of the Royal Entomological Society of London has learnt with considerable regret that in spite of its earnest appeals to Lepidopterists to refrain from collecting any *Sedina buettneri* in the Isle of Wight last year, quite a number of collectors visited the locality, and did, in fact, collect the species. Ordinary common sense would indicate that the activities of the local District Council in the area must have so jeopardised the existence of this species in the marsh that its population must have sunk already to the danger level. If it is to continue to flourish there the very greatest restraint is necessary on the part of collectors.

I am instructed by the Committee to appeal to collectors to leave this insect alone, otherwise some greedy entomologist will certainly be in a position soon to say proudly "I took the last."

N. D. Riley.

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

DISTRIBUTION OF 918 MEMBERS IN BRITISH ISLES
THERE ARE 38 MEMBERS OVERSEAS

Compiled and Edited by B. L. J. BYERLEY, F.R.E.S.

AES
BULLETIN
No. 139
JULY 1952

WHY THESE CONTENTS?

The Amateur Entomologists' Society depends for its success on the initiative and helpfulness of its members. There are only two occasions each year when we can meet together and converse—the Annual Exhibition and the Annual General Meeting. It is, therefore, very important that at times we should publish an up-to-date Membership List so that each of you can find out where all the others are. Many of you, having read the few columns left over for more usual matter, may tend to put this issue away without more ado. May we suggest that instead you should *use* it?

Are there any fellow-members in your neighbourhood? That will readily be seen if you turn to page 71 where you will find a Geographical Key. This gives only surnames, but you can turn back to the main list and discover address and interest. Should you discover someone whom you do not already know, give him a call, by telephone or in person. It is very likely he can help you, or you him.

Where are you going on holiday? It may assist your own collecting a lot if you can find a member who lives within the neighbourhood. The same Geographical Key is your source of information.

Perhaps you are feeling rather an isolated student of some lesser-known Order than Lepidoptera, or you may have developed a keen interest in some phenomenon such as larval colours or over-wintering. Like-minded members have already got together, postally if not physically, and have formed a number of Study Groups. The names of these (and of the member who has offered to be the focus of each) will be found on page 76.

There may be no existing group on *your* specialism. Why not look for kindred spirits? It takes much less time than you would suppose to run the eye over all the members' interests as shown in the brackets at the end of an entry. Write off to likely ones, preferably enclosing a stamped addressed envelope. By the same token, please respond promptly to anyone who writes to you from "out of the blue."

Lastly, do not overlook the usefulness of the Advisory Panel (page 75). Some of the advisers complain that they get no queries from one year's end to another. But do make sure that you write to the *appropriate* adviser; several have been unnecessarily troubled for advice on subjects quite outside their special fields. The Editor is hoping to receive for publication in the *Bulletin* any questions of general interest which have been informatively answered by members of the Panel. He leaves it to the satisfied questioner to submit question and answer together.

* * *

MEMBERSHIP LIST

Members are requested to notify B. L. J. Byerley, 48 Elmgrove Road, Harrow, Middx., of changes of address and biological interests. Please add your membership number to all AES correspondence.

Abbreviations

* = Junior Member
† = Affiliate Member
‡ = Honorary Member
agric. = agricultural
aq. = aquatic
B. = biology
Bot. = botany
C. = Coleoptera (beetles)
Con. = conchology
D. = Diptera (flies)
Der. = Dermaptera (earwigs)
E. = ecology
econ. = economic
ent. = entomology
esp. = especially
exot. = exotic
fw. = fresh water
gen. = general
Geo. = geology
H. = Hymenoptera (ants, bees, wasps, sawflies, parasites)
Hem. = Hemiptera (bugs)
Het. = Heteroptera (het-bugs)
Hom. = Homoptera (hom-bugs)
L. = Macrolepidoptera (moths and butterflies)
M. = migration
mic. = microscopy
ML. = Microlepidoptera

N. = Neuroptera (mealy wings, lacewings)
NH. = natural history
O. = Odonata (dragonflies)
ornith. = ornithology
Orth. = Orthoptera (roaches, grasshoppers, crickets)
P. = Photography
R. = Rhopalocera (butterflies)
T. = Trichoptera (caddis flies)
Z. = zoology

The highest number in this membership list is No. 2113.

A'Brook, J. (1582), 12 Lakenheath, Southgate, London, N.14. (gen. ent.)
Adams, H. W. (510), 712 Woodborough Rd., Nottingham. (L.)
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Ainsworth, Miss J. M. (1617*), Poplar House, 14 Monmouth St., Topsham, Devon. (L.)
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Allen, Miss D. M. (2081), Furzedown College, Welham Rd., S.W.17.
Allen, Rev. P. V. M. (1130), The Vicarage, South Bank, Middlesbrough, Yorks. (L.)
Allen, S. E. (2001), Fir Villa, Station Rd., Liss, Hants. (C.)
American Museum of Nat. History, The (1300†), Central Park West, at 79th Street, New York, N.Y., U.S.A. Com. to Miss H. Gay. (gen. ent.)
Anderson, G. D. (1933*), 75 Copgrove Rd., Leeds, 8. (C.)
Andrews, Miss E. M. (2020), 30 The Mead, West Wickham, Kent. (L., C.)
Angus, W. G. (883), Watt Memorial School, Greenock, Renfrewshire. (C., D.)
Appleton, A. H. (1612), " Spinney Hollow," Disley, nr. Stockport, Cheshire. (H., L.)
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Austin, N. J. (966), Chapel House, High St., Thorpe - le - Soken, Essex. (L., C., H., Hem., O., ornith., Geo., Con.)
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Ayres, C. E. (2021), 18 Candover Close, Harmondsworth, nr. West Drayton, Middx. (L.)
Backwell, L. (2070), Pharelands, Searle St., Crediton, Devon. (L.)
Bailey, N. M. (1230), Hill Crest, Ash Grove, Limefield, Bury, Lancs. (L., gen. ent., Bot., ornith.)
Bailey, P. R. (1824), "Glendale", Scotby, Cumberland. (gen. ent.)
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Beck, W. (1822), 18 Aspin Lane, Knaresborough, Yorks.

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Bennett, M. J. (830), Leechwell Cottage, Totnes, Devon. (L.)

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Benson, R. H. (1444), "Denehurst", Jesmond Park East, Newcastle-on-Tyne 7. (L.)

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Boxall, H. (1714), Yewtree Cottage, Iden Green, Benenden, nr. Cranbrook, Kent. (ML., O., aq. life, gen. ent.)

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Brangham, A. Norman (18), 9 St. Alban's Grove, London W.8. (Ants)

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Burtt, E. T. (1756), King's College, Newcastle-on-Tyne. (D., gen. ent.)

Bushby, L. C. (1075), Curator of Insects, Zoological Society of London, London N.W.8. (gen. ent.)

Byerley, B. L. J., F.R.E.S. (788), 48 Elmgrove Rd., Harrow, Middx. (D., gen. ent.)

Byford, W. J. (982), 72 Oakdale Rd., London E.11. (L., gen. ent.)

Caines, J. B. (1692*), 3 Wellington Terrace, Clifton, Bristol 8. (L.)

Calvert, V. (2045*), 94 Bolckow St., Guisborough, N. Yorks. (L.)

Cameron, S. J. (2047*), 77 Addison Rd., London, W.14. (L., C.)

Cameron, Dr. T. W. F. (1007), Highfields, Walderslade, Chatham, Kent. (gen. ent.)

Campbell, K. (1921), 22175255 L/Bdr. Campbell, F. Section, Hut 37, 22/52 OBS. RGT. R.A., Tilshead Lodge Camp, Tilshead, Wilts. (gen. ent., B., NH., mic.)
Capener, A. L. (6), St. George's Home for Boys, P.O. Box 4, Cleveland, Johannesburg, S. Africa. (Membracidae)
Carlton Park Secondary Modern Boys School (1523†), Russell Town Ave., Bristol 5. Com. to R. C. Shearn.
Carpenter, Prof. G. D. Hale, M.B.E., D.M.,‡ Penguelle, Hid's Copse-Road, Cumnor Hill, Oxford.
Carr, R. W. D. (1175), Hillcrest, Totteridge Lane, London, N.20.
Cartwright, G. T. (958), Spring Cottage, Main Rd., Felpham, Bognor Regis, Sussex. (L.)
Cartwright, H. (1659*), 29 Arthur Rd., Wimbledon, S.W.19. (L., silkmoths)
Cave, R. G. (1338), 16 Round St., Rugby, Warwickshire. (L.)
Chambers, A. E. C. (450), 36 Watergate, Grantham, Lincs. (L.)
Champion, A. F. (777), 1 Cornwall Close, Barking, Essex. (L.)
Chandler, H. G. (1918), 92 Talbot Rd., Luton, Beds. (L., esp. rearing exot., and silkmoths)
Chapman, D. G. (1590*), Ngoma, Helmore Crescent, Laindon, Essex. (L.)
Chapman, D. I. (1648*), 38 Horn Lane, Woodford Green, Essex. (L.)
Charlson, S. (520), 89 Market St., Stalybridge, Cheshire. (ML., M.)
Chatfield, B. G. (1704), 1 Sydney Terrace, Station Rd., Hawkhurst, Kent. (L., gen. ent., NH.)
Chipperfield, H. E. (64), 27 Chilton Way, Wallington, Surrey. (L.)
Chitty, F. J. (2083), Mereworth, Parkwood Rd., The Ridge, Hastings, Sussex. (L.)
Christ Church School (1905†), Calabar, West Africa. Com. to the Principal.
Christie, L. (710), Station House, London Rd., Hackbridge, Wallington, Surrey. (L.)
Claridge, M. F. (1420*), 117-121 Railway Terrace, Rugby, Warwickshire. (L.)
Clark, A. B. (1495), 87 Vicarage Rd., Watford, Herts. (L., gen. ent.)
Clark, T. J. (1970*), 87 Upper Bristol Rd., Milton, Weston-super-Mare, Som.
Clarke, C. A. (1569), High Close, Thorsway, Caldy, Cheshire. (L.)
Clarke, H. S. (1866), 46 High St., Chatteris, Cambs. (L.)
Clarke, J. S. (1718), Fishpools, Netherseale, Burton-on-Trent, Staffs. (gen. ent.)
Clarke, M. D. A. (2060*), High Close, Thorsway, Caldy, Wirral, Cheshire. (L., esp. breeding)
Clarkson, F. W. (1437), Sheriff Hall, Sheriff Highway, Headon, nr. Hull, Yorks. (L.)
Classey, E. W., F.R.E.S. (41), 5 Carlton Ave., Feltham, Middx. (L., Mosquitoes)
Clayton, Major P. M., R.A.S.C. (1907), c/o Grindlay's Bank Ltd., 54 Parliament St., London, S.W.1. (gen. ent.)
Cockayne, Dr. E. A.,‡ 8 High St., Tring, Herts. (L.)
Coldcotes Beetle Club (1172†), Coldcotes Secondary Modern Boys' School, Thorn Walk, Leeds. (C.)
Collier, Major A. E. (1066), c/o Lloyds Bank, 6 Pall Mall, London S.W.1.
Collier, A. S. F. (1980*), 6 Charnham St., Hungerford, Berks. (L., C.)
Collier, J. H. (1960*), Moorside, South Brent, S. Devon. (L.)
Collins, G. B. (1036), 19 Torridge Rd., Thornton Heath, Surrey (gen. ent.)
Collins, R. J., F.R.E.S. (256), Dept. of Entomology, Natural History Museum, Cromwell Rd., London S.W.7. (L. esp. World Geometridae)
Collinson, W. E. (247), 20 Pye Nest Drive, Halifax, Yorks. (L. esp. Bombyces)
Collyer, N. A. B. (132), 27 Guildford Way, Wallington, Surrey. (L.)
Colman, K. E. S. (112), Fenton House, Fenchurch St., London E.C.3. (gen. ent.)
Conder, P. J. (1568), Dale Fort Field Centre, Haverfordwest, Pembs. (E. of Skokholm Island)
Cooke, J. A. L. (1875*), 123 Woodstock Rd., Oxford. (Arachnida, C., H.)
Cooke, W. R. (1937), 73 High St., Thurnscoe, nr. Rotherham, Yorks. (aq. ent.)
Cooper, Beowulf A., B.Sc., A.R.C.S., F.R.E.S.,‡ 27 Spilsby Rd., Boston, Lincs. (gen. ent., L., M., E., econ. ent., C.)
Cooper, Mrs. G. M. R., B.Sc. (447), 27 Spilsby Rd., Boston, Lincs. (B.)
Cooper, Mrs. L. d'O. (1408), 61 Okehampton Rd., London N.W.10. (gen. ent.)
Cornelius, J. A. (1020), 29 Grangecliffe Gdns., London S.E.25. (L.)

Cornes, T. G. (2101*), Grasmere Farm, P.O. Lalapanzi, Southern Rhodesia. (L.)

Cove, Miss (612), Avery Hill Training College, Avery Hill Rd., Eltham, S.E.9.

Cowley, J., M.A., F.R.E.S. (771), Holywell House, Edington, Bridgwater, Som. (O. of world, D., H.)

Cox, D. (2019), 59 Neville's Court, Dollis Hill Lane, London, N.W.2. (D., microscopic Insecta)

Coxey, S. (358), 203 Green Lane, Bolton, Lancs. (L.)

Craig, A. J. (2013), 8 Foster Rd., London, W.4. (L.)

Craig, Miss J. C. D., B.Sc., A.R.I.C. (930), 2 Devonshire Gdns., Glasgow W.2. (L.)

Crammer, B. (2065*), 52 Elmfield Ave., Stoneygate, Leicester. (mic., B.)

Crawforth, A. (1734*), 20 Elmwood Ave., Coventry, Warwickshire. (L., C., O.)

Cribb, J. (2044), St. Rose, Ditchling Common, Hassocks, Sussex. (C.)

Cripps, C. H., M.A. (730), Bulls Head Farm, Eakley Lanes, Stoke Goldington, Newport Pagnell, Bucks. (L. esp. R.)

Crisp, E. (668), High Street, Heathfield, Sussex. (gen. ent.)

Cross, G. S. E. (1453), 31 Avenue Rd., London N.12. (L.)

Crotch, W. J. B., M.A., A.K.C. (1181), 5b Stanley Cres., London W.11. (Silkmoths, fossil insects.)

Crowther, R. F. (1942), 12 Foston Ave., Burton-on-Trent, Staffs. (gen. ent.)

Cruttwell, G. H. W. (118), Old Ford House, Frome, Som. (L.)

Cullum, L. (1738), Harrington Cottage, Hallgate, Moulton, Spalding, Lincs. (L.)

Cunningham, D. (1233), 42 Rae St., Dumfries, Scotland. (L., Bot.)

Curd, O., F.Z.S. (129), Elsinore, Whiston Lane, Prescot, Lancs. (L.)

Curl, B. J. (1989*), 33 Fairoak Rd., Bishopstoke, Eastleigh, Hants. (L.)

Currie, J. P. (1932*), 2 Sherwood Gdns., Barking, Essex. (L., C.)

Currie, P. W. E. (977), 102 Burdon Lane, Belmont, Sutton, Surrey. (Orth., H.)

Dale, A., B.Sc. (908), Lady Manners School, Bakewell, Derbyshire. (Beekeeping, NH., gen. ent.)

Dale, C. H. P. (1838), The Island, Heath Drive, Walton on Hill, Surrey. (econ. ent., H.)

Dale Fort Field Centre (2091†), Haverfordwest, Pembs., comm. to J. H. Barrett, Warden.

Dale, J. A. (1206), Copley, Oatlands Close, Weybridge, Surrey. (gen. ent.)

Daley, Rev. F. (1798), St. Cuthbert's Grammar School, Benwell Hill, Newcastle-on-Tyne, 5. (Insect E.)

Dalton, R. F., M.A. (1530), The Dorset County Museum, Dorchester, Dorset. (Museum Display)

Daltry, H. W., F.R.E.S., M.S.B.E. (972), 68 Clifton Rd., Rugby, Warwickshire. (Hem., N., T., ML., C., H.)

Damsell, H. S. (2024), c/o Pelling, Stanley & Green Ltd., 51 Broad St., Bristol, 1. (L.)

Dannreuther, Capt. T., R.N. (60), Windycroft, Hastings, Sussex. (M.)

Darling, D. A. (2102*), 232 Ridge Rd., Sutton, Surrey. (L., C.)

Darwin Society, The (817†), Shrewsbury School. Com. to Major W. J. Pendlebury, Gyland, Canonbury, Shrewsbury. (L., C., H.)

d'Assis-Fonseca, E. C. M. (2079), 18 Grange Park, Henleaze, Bristol. (D., Het.)

Davidson, A. R. (575), 2 Foster Rd., Formby, Liverpool. (gen. ent., L.)

Davies, M. J. (760), 31 Kinross Ave., Worcester Park, Surrey. (C. esp. Geodephaga)

Davis, Miss A. (2023*), 71 Bishop Rd., Bristol, 7. (gen. ent.)

Davis, R. V. (1880), 2A School St., Rugby. (L.)

Day, G. V. (29), Furlong Rd., Stoke Ferry, King's Lynn, Norfolk. (L.)

Deacon, Miss D. M. (1959), The Nurses Home, Greys Hospital, Pietermaritzburg, S. Africa.

de Mercado, G. I. (1588), Geophysical Observatory, Shetland Isles, Scotland. (D., Thysanura)

Denman, H. F. (1912*), 29 Malpas Drive, Pinner, Middx. (H., gen. ent.)

Desmares, M. (2069*), Woodside, Hudswell, Corsham, Wilts. (L.)

de Whalley, L. D. (1784*), 45 Devonshire Rd., Bexhill-on-Sea, Sussex. (L.)

de Worms, Baron C., Ph.D., F.R.E.S. (260), 26 Common Close, Horsell, Woking, Surrey. (L.)
Dexter, S. (847), Rosevean, Constantine Bay, nr. Padstow, Cornwall. (gen. ent.)
Dibb, R. A. L. (1688), 255 Beverley Rd., Kirk Ella, E. Yorks. (L., C.)
Dicker, B. E. (1811*), 1291 Christchurch Rd., Iford, Bournemouth, Hants. (L.)
Dixon, G. F. (1809), 63 War Lane, Harborne, Birmingham 17. (D., C.)
Dixon, M. E. (1674*), 18 Kingsholm Square, Gloucester. (L.)
Dolley, F. H. (1976), Dooley's Hill Nurseries, Normandy, Guildford, Surrey. (L.)
Dolton, H. L. (1122), 36 Chester St., Reading. (L.)
Downing, F. S. (1772), Red Bull Inn, Kingsley, nr. Frodsham, Cheshire. (C.)
Downing, M. F. (1878), Southbank, The Shrubbery, Weston-super-Mare, Som. (L.)
Drummond, D. C. (2017), Bonville, Bishopthorpe, York. (C. esp. Chrysomelidae)
Duffield, C. A. W. (2048), Pickersdane, Brook, nr. Ashford, Kent. (local L., C., H., D., Hom.)
Duke, A. J. H. (97), 17 St. Bedes Rd., Three Anchor Bay, Cape Town, S. Africa. (L.)
Duncan, S. (280), 43 Wilson St., Anlaby, Yorks. (L.)
Dunn, T. C. (1845), The Poplars, Chester-le-Street, Co. Durham. (L.)
Durham, J. (1174), 62 Reigate Rd., Brighton 5, Sussex. (NH.)
Durrant, K. C. (1375), 83 Sandy Lane, E. Dereham, Norfolk. (gen. ent., esp. D.)
Durrant, W. J. (1196), 64 Pine Gardens, Surbiton, Surrey. (D., O., C.)
Durston, J. H. J. (1997*), 46 Southwell, Portland, Dorset. (C., L., H.)
Dutton, B. V. F. (1687*), 46 Kingsmead, New Barnet, Herts. (L.)
Dyce, J. W. (1602), Hilltop, 46 Sedley Rise, Loughton, Essex. (L.)
Dyson, R. C., N.D.H., F.R.E.S. (91), 112 Hollingbury Park Ave., Brighton 6, Sussex. (L., foodplants)
Eade, G. T. (190), 3 Rutland Rd., Hove 3, Sussex.
Eagles, T. R. (194), 32 Abbey Rd., Enfield, Middx. (L.)
Earl, B. C. A. (1388), 2 South Park, Loose Rd., Maidstone, Kent. (L.)
Edelsten, H. M., F.R.E.S. (208), Bramble Hill, Balcombe, Sussex. (L.)
Edwards, N. (2057*), 52 Little Paddocks, Ferring, Sussex. (L., C., gen. ent.)
Edwards, Miss K. (2063), Jasmine Cottage, Somerwood, Rodington, Shrewsbury, Salop. (L., O., NH.)
Edwards, R. C. (949), Arlesey, Pilgrim's Way, Westerham, Kent. (gen. ent.)
Edwards, Canon T. G., M.A., F.Z.S. (754), Holy Trinity Vicarage, London S.W.2. (gen. ent. esp. L.)
Eley, R. (1201), c/o Mr. Ruddock, Hall Cottages, Nowton, nr. Bury St. Edmunds, Suffolk. (L. Heterocera)
Ellison, W. M. (1318), 40b Victoria Rd., Scarborough, Yorks. (L.)
Emery, R. J. R. (1844*), 3 Hillsborough Park Rd., Ilfracombe, Devon. (L.)
Emmet, A. M., M.B.E., M.A. (1379), St. Edward's School, Oxford. (L.)
Ennion, Dr. E. A. R. (1854), Monks' House, Seahouses, Northumberland. (gen. ent., H.)
Ensor, P. C. (891), 26 Webb Lane, Hall Green, Birmingham 28. (L.)
Evans, G. C. (1788), 159 North Walsham Rd., Old Catton, Norwich, Norfolk.
Evans, J. J. T. (1576*), Mill Field, Mill Lane, Chalfont St. Giles, Bucks. (L.)
Evans, J. O. (1840), 35 Maesygarreg, Cefn Coed, Merthyr Tydfil, S. Wales. (L., C., fw. gen.)
Ewart, A. (1861*), 48 Longton Grove, Sydenham, S.E.26. (L.)
Ewing, A. W. (1731*), 14 Hamilton Terrace, Portobello, Midlothian. (ML.)
Ewing, K. W. (1121), Castleway, Calne, Wilts. (L. esp. breeding)
Exmouth Training College (1643†), Rolle Rd., Exmouth. Com. to Mrs. Leadley-Brown. (L.)
Farage, G. (2004*), 127 The Drive, Beckenham, Kent. (L.)
Farley, K. (1813*), Lashenden Villa, Biddenden, Kent. (C., experimental ent.)
Farwell, I. G. (1445), Mayfield Villa, Portmore, Lymington, Hants. (L.)
Fearnhough, T. D. (47), 13 Salisbury Rd., Dronfield, Derbyshire.

Featherstone, C. (1490), Rhode Common, Dunkirk, nr. Faversham, Kent. (gen. ent.)
Fenn, J. L. (1665), "Fernleigh", Oxborough Rd., Stoke Ferry, nr. King's Lynn, Norfolk. (L.)
Ferguson, E. A. (1311), 1213 Bellflower Ave. S.W., Canton 4, Ohio, U.S.A. (L.)
Ferneley, W. H. (1540), Frogs Hall, Waltham, nr. Canterbury, Kent.
Fidler, J. G. (1978*), The Banks, Knowl Hill, Twyford, Berks. (L., C.)
Fidler, Dr. J. H. (1256), Ministry of Agriculture and Fisheries, University College of South Wales and Mon., Cathay's Park, Cardiff. (T., Hem. esp. Aphididae)
Field Club, The (1882†), Grammar School, Houghton - le - Spring. Com. to G. F. W. Hart. (gen. ent.)
Field, G. N. (1000), 14 Mitchley Grove, Sanderstead, Surrey. (L.)
Finlay, J. F. (806), Windgate Farm, Combe Raleigh, nr. Honiton, Devon. (L.)
Finlay, Capt. R. A. L., M.B.E. (229), 9 Hermitage Gdns., Edinburgh 10. (gen. ent.)
Firth, J. Digby, F.S.A. (1210), 347 Otley Rd., Leeds 6. (gen. ent.)
Fisher, J. M. (1305), Old Rectory, Ashton, Northampton. (L.)
Floyd, C. G. (1764), "Jupiter", Dodwell, Stratford-on-Avon, Warwickshire. (L.)
Floyd, J. F. M. (2018), High Bridge Mill, Cuckfield, nr. Haywards Heath, Sussex. (H., B., spiders)
Fluck, G. G. (569), Redroof, Reading Rd., Fleet, Hants. (L.)
Ford, Rev. G. A. (377), Balsham Rectory, Balsham, Cambs. (L.)
Ford, T. H. (1642), 275 Derbyshire Lane, Sheffield 8. (L.)
Fordham, P. J. (1808*), 15 Edward Close, Gidea Park, Essex. (O., L., C., Arachnida)
Fordham, R. (2076*), 82 Grange Rd., Gillingham, Kent. (L., C.)
Fox, K. J. (1459*), 20 Scotsdale Rd., London S.E.12. (L.)
Fox, T. H. (105), 226 St. Albans Rd., Watford, Herts. (L., breeding)
Fraser, Lt.-Col. F. C., I.M.S. Retd. (890), 55 Glenferness Ave., Winton, Bournemouth, Hants. (O., N., Orth.)
Fraser, R. A. (2106), The Foundry Cottage, Ramsbury, Wilts.
Freeman, John A., Ph.D. (986), 5 Woodmere Way, Beckenham, Kent. (Stored Products ent.)
Freeman, R. (1957), 4 Ashley Ave., Ilford, Essex. (C.)
Gardiner, B. O. C. (225), 34a Storeys Way, Cambridge. (L., gen. ent., N.)
Garraway, G. J. (1826*), 45 Albert Rd., Coleford, Glos. (L., ML.)
Garrett-Jones, C. (989), Iken Hall, Woodbridge, Suffolk. (L., D.)
Gates, M. D. C. (1992), 5 Garden Close, Banstead, Surrey. (R.)
Gathergood, Miss A. L. (2005), Rose Bank, Three Bridges Rd., Crawley, Sussex. (gen. ent., breeding)
Gay, P. A. (1393), School House, Hartbury, Glos. (L., C., D., H.)
Gaze, W. E. (1812), The Cedars, Castle Hedingham, Halstead, Essex. (L.)
Gent, P. J. (192), 3 Union Rd., Wellingborough, Northants. (L.)
Gent, S. (2030), Viewmount, Moffat, Dumfriesshire. (H., D.)
George, R. S. (1402), Flat 1, 46 Northgate St., Gloucester. (B., Bryology)
Gerard, Hon. R. (359), Blakesware, Ware, Herts. (L.)
Gibbs, G. W. (1212*), Tree Tops, Muritai Rd., Eastbourne, Wellington, New Zealand. (gen. ent.)
Gibbs, H. L., B.E.M. (2036), Sun-dial Cottage, Balscote, nr. Banbury, Oxon. (L.)
Gibson, Miss E. M. (311), St. Cuthberts, King George Ave., Petersfield, Hants. (L.)
Gilbert, A. E. H. (1631), 5 The Avenue, Hatch End, Middx. (L.)
Gilder, B. E. (2112), 138 Braemar Rd., N.W.10. (H.)
Gilvary, R. B. (1917*), 49 Hartland Drive, Ruislip, Middx. (L.)
Gobbett, D. J. (1839*), 6 Ramsden Drive, Collier Row, Romford, Essex. (L.)
Goddard, L. (1801), Kent Farm Institute, Sittingbourne, Kent. (agric. pests, H.)
Goddard, P. F. (1881*), 8 Calverley Rd., Stoneleigh, Ewell, Surrey. (L.)
Golby, W. A. (1412), 136 Milner Rd., Birmingham 29. (gen. ent.)
Golding, D. P. (904), 517 Foots Cray Rd., London S.E.9. (L.)
Goodbody, G. (1470), 14 Downs Valley Rd., Woodingdean, nr. Brighton, Sussex. (L.)
Goodman, A. de B. (920), 20 Brooklands Ave., Cambridge. (gen. ent.)
Goodwin, R. J. C. (1551), The Elms, Chislehurst Rd., Sidcup, Kent. (L.)

Gough, Miss F. M. (1786), 42 Rocky Lane, Broad Green, Liverpool 16. (gen. ent.)
Gowing-Scopes, E. (909), Oakhurst, Oakwood Rd., Crofton, Orpington, Kent. (L., C.)
Grace, J. (2097), 72 The Crescent, Ravensthorpe, Dewsbury, Yorks. (L.)
Graham, E. W. (1142), Windy Ridge, Little Widbury, Ware, Herts. (L.)
Grant, F. T. (276), 45 Shepway Ave., Maidstone, Kent. (C., L.)
Graves, P. P. (1831), Ballylickey House Hotel, Bantry, Co. Cork, Eire. (L., O., Orth.)
Gray, W. J., M.R.C.V.S., F.R.E.S. (1843), c/o Dept. of Veterinary Service, Blantyre, Nyasaland, Central Africa. (L., D.)
Green, C. D. (2043*), 14 Highcroft Ave., Bebington, Wirral, Cheshire. (L.)
Green, J. (1044), 61 Ruskin Rd., Crewe, Cheshire. (C., gen. ent.)
Green, J. G. (1795), 42 D'Arcy Gdns., Kenton, Harrow, Middx. (C.)
Greenhill, J. S. (1883), 7 Barnett Wood Lane, Ashtead, Surrey. (L.)
Greenwood, R. S. (757), 22 Maidstone Rd., Rochester, Kent. (L.)
Griffin, Mrs. E. M. (1637), 1 Park Hall, Crooms Hill, London S.E. 10. (gen. ent.)
Griffiths, G. (1217), Adwy Goch, Blaenau Festiniog, Merionethshire. (gen. ent., parasites)
Grimwood, K. W. (1625), 20 Lancing Rd., Newbury Park, Ilford, Essex. (L.)
Gripper, A. G. (1836), Springates Cottage, Henham, nr. Bishop's Stortford. (L. esp. Sphingidae)
Groves, E. W. (1792), 143 Carshalton Park Rd., Carshalton, Surrey. (gen. ent.)
Grundy, M. T. (1944*), Westfield Cottages, Ashwell, nr. Oakham, Rutland. (L.)
Guile, C. T. (1752), 51 Coity Rd., Bridgend, Glamorgan. (parasitic orders)
Gully, R. G. (1797), 146 Beckenham Rd., Beckenham, Kent. (L., Sphingidae)
Hague, N. G. (943), 39 Heath Drive, Potters Bar, Middx. (L., O.)
Halkier, W. W. L. (1829), "Arnprior", Thorp Ave., Morpeth, Northumberland. (gen. ent.)
Hall, Rev. J. H. V. (1520), Hutton Roof Vicarage, Kirkby Lonsdale, via Carnforth, Lancs. (L.)
Halstead, T. K. (1910*), 11 Tudor Grove, Sunderland, Co. Durham. (L.)
Ham, B. J. (1327), "Mona", Kings Saltern Rd., Lymington, Hants. (L.)
Hamill, J. M., O.B.E., M.D., D.Sc. (2010), 10 Holland Park Court, London, W.14. (physiology and genetics)
Hamlyn, E. T. (1923), 8 Kingsley Rd., Plymouth, Devon. (gen. ent.)
Hammond, D. (1846), Kingsview, Bladon, Oxon. (C., gen. ent.)
Hammond, H. E., F.R.E.S. (423), 16 Elton Grove, Birmingham 27. (L., ML., C., gen. ent.)
Hanson, M. K. (1653), 95 Mere Rd., Leicester. (L., Insect Classification)
Hanson, P. D. (1889), The Peak Bungalow, Compton Bishop, nr. Axbridge, Somerset. (L.)
Hanson, S. M. (320), 167 Gunnersbury Park, Pope's Lane, W.5. (L.)
Harding, C. J., B.Sc. (894), BM/NEWT, London W.C.1. (B.)
Harding, J. G. R. (1669), 37 Chestnut Ave., Withernsea, E. Yorks. (L.)
Hardman, G. A. (2050*), 16 Lindleywood Rd., Fallowfield, Manchester, 14. (L.)
Hardman, J. A. (1234), 10 Hands Lane, Bury Rd., Rochdale, Lancs. (gen. ent., L., ML., NH., Bot., ornith.)
Hards, C. H. (176), 40 Riverdale Rd., London S.E. 18. (L., mic.)
Harle, D. F. (889), "The Studio", Strand St., Sandwich, Kent. (E.)
Harper, Comdr. G. W., R.N. (1169), Neadaich, Newtonmore, Inverness-shire. (L., gen. ent.)
Harper, M. W. (1553*), Neadaich, Newtonmore, Inverness-shire. (L., gen. ent.)
Harris-Evans, Rev. F. D. (1999), Blaston Rectory, Market Harborough, Leics. (L.)
Harris, K. C. (1791), 2 The Close, North View, Eastcote, Pinner, Middx. (gen. ent.)
Harrison, D. G. (1689), 125 Mawson Rd., Cambridge. (gen. ent. esp. R.)
Harrison, E. (1676), 53 Borrowdale Rd., Lancaster. (L.)
Harrison, Prof. J. W. Heslop, D.Sc., F.R.S., F.R.E.S. (716), Gavarnie, The Avenue, Birtley, Co. Durham. (gen. ent., L., Biogeography)

Harrison-Gray, M. (1806), 36 Eton Avenue Garage, Lancaster Grove, London N.W.3. (Saturniidae)

Hart, B. H. (1816), 94 Ramsey Rd. North, Dovercourt. Essex. (H.)

Hartley, J. C. (1939), The Poplars, Fulbourn, Cambs. (L.)

Harwood, N. W. (825), 6 Danesfort Ave., Guisborough, N. Yorks. (L., P.)

Harwood, P. (273), Ardinsh, Kincraig, Inverness-shire. (C., Hem., Hom., H., Aculeata)

Hatcher, F. L. (1441), 18 St. Edmunds Drive, Stanmore, Middx. (D.)

Hawdon, A. S., B.Sc. (1469), 47 Keslake Rd., London N.W.6. (L.)

Haxby, C. R. (1508), 4 Windermere Terrace, Great Horton, Bradford, Yorks. (L.)

Haynes, R. F. (834), 132 Fairfield Drive, Dorking, Surrey. (L., gen. ent., Bot.)

Haynes, R. G. (1545), 5 Lucas Terrace, Lucas Lane, Plympton, Plymouth, Devon. (L.)

Haywood, N. (1924), 100 London Rd., Sleaford, Lincs. (L.)

Heard, M. J. (595), 65 Park Side, Didcot, Berks. (L. esp. Genetics)

Hebden, A., F.R.E.S. (2075), Agricultural Education Dept., County Hall (Ag. 9), Wakefield, Yorks. (H. esp. Apidae)

Hedderly, J. C. (1979*), 110 Hazel Crescent, Kidlington, Oxford. (L., C., N.)

Heley, R. G. (731), Lygoes, Burcott, Wing, Leighton Buzzard, Beds. (L., Bot.)

Hellings, G. E. A. (297), 49 Wheatsheaf Close, Woking, Surrey. (L.)

Henderson, C. W. (21), 150 Knightthorpe Rd., Loughborough, Leicestershire. (C., Brit. and exot.)

Hendy, A. F. (2096), 128 Long Elmes, Harrow Weald, Middx. (gen. ent., esp. L., C.)

Henshaw, E. J., B.Sc. (692), 58 Berwyn Grove, Maidstone, Kent. (L., horticultural ent.)

Henstock, Dr. H., Ph.D., M.Sc., F.I.C. (209), Glengariff, Caerwys, Mold, Flint. (L.)

Heppell, D. H. (1690), 3 Jacomb Place, Bridgemary, Gosport, Hants. (L.)

Heselden, A. J. M. (2084), 85 Park Hill Rd., Bexley, Kent. (L., esp. sub-spp. & local variation)

Hesselbarth, G. (1761), (23) Diepholz / Hann, Röhlingstrasse 8, Germany. (L.)

Hewson, F. (601), 23 Thornhill Drive, Shipley, Bradford, Yorks. (L.)

Hick, A. E. (567), Sherrards, Cricket Field Lane, Bishop's Stortford, Herts. (O., H.)

Higgins, W. J. (2072*), Standard Nurseries, Old Worthing Rd., East Preston, Angmering, Sussex. (L. esp. Nymphalidae & wainscots)

Hill, A. R., B.Sc., Ph.D., F.R.E.S. (1043), Zoology Dept., The University, Glasgow, W.2. (E. esp. aq., Hem.)

Hill, R. J. (1505), 31 Holland Rd., Luton, Beds. (L.)

Hillaby, J. D., F.Z.S., F.R.E.S. (1492), 85 Chomley Gdns., London N.W.6.

Hilliard, R. (99), 54 Gyles Park, Stanmore, Middx. (L., NH.)

Hillton, G. W. (1702), 108 Tattersall Gdns., Leigh-on-Sea, Essex. (L.)

Hitchens, P. E. N. (669), Sicklebank, Horam, Sussex. (L. esp. temperature trials on pupae)

Hobbs, C. R. (1850*), 135 Doncaster Rd., Southmead, Bristol.

Hodder, M. R. (1971*), 13 South Rd., Wyke Regis, Weymouth, Dorset. (C., L.)

Hodge, W. F. (1719), Holly Villas, Cranbrook Rd., Goudhurst, Kent. (L.)

Hodges, G. B. (314), 12 London Rd., Braintree, Essex. (L.)

Hodgkinson, R. (2042), Lindon, Lynch Rd., Farnham, Surrey. (Acridiodea esp. Mole Crickets, H.)

Hodgson, E. (2086), 9 Station Rd., Hetton-le-Hole, Co. Durham. (D. esp. Culicidae)

Hodson, E. V. (1392), 19 Stamford Rd., West Bridgford, Nottingham. (L.)

Hollander, T. (1776*), Gidleigh Lodge, Chagford, Devon. (L.)

Holmes, A. M. (1198), 11 Grotto Rd., Rondebosch, Cape Town, S. Africa.

Holroyd, G. C. (253), 8 Elmside, Onslow Village, Guildford, Surrey. (L.)

Homewood, C. T. H. (1873), 38 Ditton Park Estate, New Road, Ditton, nr. Maidstone, Kent. (L.)

Honeybourne, T. J. (1558), 97 Birchwood Rd., Wilmington, Dartford, Kent. (L.)

Hood, L. A. (526), Orchard Cottage, Tolleshunt Major, Essex. (L.)

Hope Professor, The (666), Hope Department of Entomology, University Museum, Oxford. (Bionomics)

Hopkins, Miss B. A. (827), 43 Hainton Ave., Grimsby, Lincs. (L., breeding)

Horner, L. B. (917), 68 Balckaw St., Guisborough, Yorks. (gen. ent.)
Horsley, H. P. (1624*), 40 Bath St., Ipswich, Suffolk. (C., L.)
Horswell, D. L. (1951*), Hillcrest, Tomswood Rd., Chigwell, Essex. (L., gen. ent.)
Horton-Ormerod, S. (1370), 17 Kenwood Rd., Moss Bank Park, Bolton, Lancs. (Arachnology)
Horton, H. V., M.Ph.S., M.B.S., M.S.P.A., A.R.I.Chem. (1955), 315 The Green Way, Epsom, Surrey. (gen. ent.)
Hosking, C. (2022), 115 Wilton Rd., Southampton, Hants. (P.)
House, D. N. (1656), 80 Osborne Rd., Portswood, Southampton, Hants. (L.)
Howard, A. H., F.Z.S. (2059), 6 Fielding Rd., Blackpool, Lancs. (gen. ent. esp. pests)
Howarth, T. G., B.E.M., F.R.E.S., F.Z.S. (1627), Dept. of Entomology, British Museum (Nat. History), Cromwell Rd., S.W.7. (L.)
Humphrey, S. W. (386), Pear Tree House, Roade, Northants. (R.)
Hunking-Molyneux, W. (1297), Greenhill, Afonwen, Caerwys, Flintshire. (gen. ent.)
Hunt, H. F. (1730), 41 Granada Rd., Southsea, Hants.
Hunt, J. W. C. (1988), Orchard Side, Waltham, Kent. (gen. ent.)
Hunt, W. (2014), 2 Park Villas, Barnstople, Devon. (C.)
Hunter, F. A. (1872), 13 Clare St., Cambridge. (gen. ent.)
Hurrell, F. J. (923), 46 Goldlay Ave., Chelmsford, Essex. (L.)
Hurst, A. (1618), The Garage, Guildford Rd., Cranleigh, Surrey. (L.)
Hutchison, Flt/Lt. D. (919), 246 Muirhall Rd., Larbert, Stirlingshire. (World R. esp. Brit. and European)
Hyatt, K. H. (1411), 3 Kidbrooke Gdns., Blackheath, S.E.3. (L.)
Hyde, G. E., F.R.E.S. (818), 20 Woodhouse Rd., Doncaster, Yorks. (L., O., H.)
Hyde-Wyatt, B. (1548), 108 Lindsay Rd., Worcester Park, Surrey. (gen. ent., O., L., H.)
Hynes, Mrs. V. D. P. (686), 152 Meachem Ave., Battle Creek, Michigan, U.S.A. (Silkmoths)
Ide, P. G. (1019), 32 Weston Rd., Guildford, Surrey.
Ika, Miss N. O. (1423*), c/o Mr. E. Etta, Medical Dept., Mamfe, British Cameroons.
Innes, Miss S. (1663*), Learney, Torphins, Aberdeenshire. (L.)
Irwin, Roderick R. (1220), 411 North Bloomington St., Streator, Illinois, U.S.A. (R.)
Isbill, M., F.R.E.S. (2026), 713/23 West Peachtree St. N.W., c/o Orkin Exterminating Co. Inc., Atlanta, Georgia, U.S.A. (C., Orth., Isoptera)
Ison, C. H. (1343), 47 Orford Rd., London E.17. (gen. ent. esp. Saturniidae, mic., P.)
Jackson, Miss Dorothy J., F.L.S., F.R.E.S. (1124), North Cliff, St. Andrews, Fife. (gen. ent., C., H.)
Jackson, S. M. (1269), 15 Westbourne Rd., Selby, Yorks. (L.)
James, R. T. H. (626), Grove Cottage, Chute Cadley, Andover, Hants. (gen. ent., ornith.)
James, W. H. (120), 6 Westlands Court, Dorking Road, Epsom, Surrey. (L. esp. R., Sphingidae)
Janes, C. T. (1635), 151 Warwick Rd., Edmonton, London N.18. (gen. ent.)
Janes, J. A. (614), 1 Ailsa Terrace, Tiverton, Devon. (L.)
Jarman, P. R. (2103*), Daisy Bank Farm, Newborough, Burton-on-Trent, Staffs.
Jarvis, C. MacKechnie, F.L.S. (650), 21 Spenser Rd., Harpenden, Herts. (C., econ. ent.)
Jeavons, J. S. (1982), 130 Wellfield St., Warrington, Lancs. (C.)
Jefferson, T. W. (242), 37 Riversdale Terrace, Sunderland, Co. Durham. (R.)
Jeffreys, Dr. D. M., M.B., B.Ch. (615), 116 Hurst Grove, Bedford. (L., ornith., gen. ent.)
Jeffs, G. A. T. (910), Nuns Holm, Nuns Corner, Grimsby, Lincs. (gen. ent.)
Jenkins, M. F. (1963), 2 Pleasant View, Llanhilleth, Mon. (C., H.)
Jeremy, Dr. W. H. R. (1778), 38 Barnfield Rd., Exeter. (C.)
Jesper, D. M. (1152), 23 Woodlands Grove, Harrogate, Yorks. (L., C., H., Beekeeping)
Johnson, Miss B. I. (1895*), 7 Villa Rd., Cheddleton, nr. Leek, Staffs. (L.)
Johnson, J. H. (1040), 53 Knighton St., Hepthorne Lane, nr. Chesterfield, Derbyshire. (C., H.)
Jones, A. V. (1633), "Hafod", Lower Cardiff Rd., Pwllheli, N. Wales. (C.)
Jones, A. W. (1165), 99 Ashmore Rd., London W.9. (D.)
Jones, E. (1699), 28 Guildford Ave., Gillshill Rd., Hull. (gen. ent., ornith., P., mic.)
Juniper Hall Field Centre (2089†), Juniper Hall, nr. Dorking, Surrey. (Warden: G. E. Hutchings)
Karp, B. (1965), 3148 Foothill Boulevard, La Crescenta, California, U.S.A.

Kearn, G. C. (2100*), 119 Pinfold Lane, Penn, Wolverhampton, Staffs. (gen. ent., esp. L., C., O.)
Keen, W. E. (1743), 67 St Julians Rd., Newport, Mon. (Arachnida)
Keetch, J. B. (2046), Rylstone, Compton Rd., South Petherton, Som. (L., O., C.)
Keji, J. A. (571), Biggs Memorial Hospital, Ithaca, N.Y., U.S.A. (L. larvae, esp. Saturniidae, Notodontidae, Eucleidae)
Kemp, J. H. (1161), 104 Oxstalls Lane, Gloucester. (aq. ent.)
Kennington, F. E. (1549), Lodge Farm, Benningholme Lane, Skirlaugh, nr. Hull, Yorks. (D., C., gen. ent.)
Kennard, A. H. (1698), 11 Marton Rd., Long Itchington, nr. Rugby, Warwickshire. (L., H.)
Kennard, H. A. (1871*), Torns, Ashburton, S. Devon. (L.)
Kennedy, A. (20), 130 Vesper Rd., Leeds 5, Yorks. (L.)
Kerrich, G. J., M.A., F.R.E.S. (551), Heath Crest, Westcott, Dorking, Surrey. (H., Parasitica)
Kettlewell, Dr. H. B. D., M.A., M.B., B.Chir., M.R.C.S., L.R.C.P., F.R.E.S. (706), Department of Zoology and Comparative Anatomy, University Museum, Oxford.
Keyes, J. B. (1603*), 11 Gunners Grove, Chingford, E.4. (L.)
Keylock, J. G. (471), 34 East St., Crewkerne, Som. (D., aq. ent.)
Kindred, A. D. (1707*), 27 Richmond Ave., East Bedfont, Middx. (L.)
King's Norton Grammar School for Boys (2099†), Birmingham, 30. Comm. to G .B. Hindle.
Knight, A. (1732*), 9 Jordans Close, Leavesden, nr. Watford, Herts. (L.)
Knight, J. E. (94), Doughton Cottage, Ross-on-Wye, Herefordshire. (L. rearing)
Knight, Major Maxwell, O.B.E., F.R.M.S., F.L.S. (956), The Homestead, Park Rd., Camberley. (aq. ent., moths, mic.)
Koerber, T. (1710), 1267 N. 24 P.L., Milwaukee 5, Wisconsin, U.S.A. (L.)
Krauss, N. L. H. (1471), 2437 Parker Place, Honolulu 5, Hawaii. (Trypetidae)
Lamb, D. F. (1915*), 3 Queensthorpe Rd., Sydenham, London S.E.26. (L.)
Lane, A. W. (1744*), 178 Ravenscourt Rd., Beckenham, Kent. (L., C.)
Lanfear, A. H. (74), 20 South Eastern Rd., Ramsgate, Kent. (L.)
Langford, P. G. (1630), Moordown, 7 London Rd., Widley, Portsmouth. (L.)
Last, H. R. (117), 12 Winkworth Rd., Banstead, Surrey. (C., esp. Brit. and foreign Staphylinidae)
La Touche, Dr. A. A. D. (884), 21 Alwoodley Gardens, Moortown, Leeds, Yorks. (Arachnida)
Lawrence, R. E. (2035), 64 Goodhart Way, West Wickham, Kent. (H.)
Le Clercq, Dr. J. (1055), Laboratoires de Biochimie de l'Université de Liége, 17 Place Delcour, Liége, Belgium. (physiological ent., H.)
Leeds, H. A. (282), Wood Walton, Hunts. (L. esp. R. vars.)
Lees, F. H. (375), The Gables, Maidencombe, Torquay, S. Devon. (L.)
Lees, J. A. G. (1779*), 37 Gawber Rd., Barnsley, Yorks. (L.)
Lees, P. (1859*), 35 Manchester St., Oldham, Lancs. (P. of L. larvae)
Le Masurier, P. C. (978), 85 Warren Drive, Tolworth, Surrey. (L.)
Leonard, B. E. (1708*), 28 Brownhill Rd., Chandler's Ford, Eastleigh, Hants. (L.)
Leonard, B. G. (96), 29 Storeton Rd., Oxton, Birkenhead, Cheshire. (L. Sphingidae)
Leonard, B. W. (1920*), 22537382 Bandboy, Band of Royal Corps of Signals, att. 7 Selection Regiment, Catterick Camp, Yorks. (L.)
Leppard, P. J. (1869*), 39 Moffat Court, Wimbledon S.W.19. (L., C.)
Leston, D., F.R.E.S., F.Z.S. (1589), 44 Abbey Rd., London N.W. 8. (Het.)
Levett, R. J. R. (1867), Netheroak, Stockcroft Rd., Balcombe, Sussex. (L., O.)
Levy, Miss F. F. (1847*), 55 Queenborough Rd., Halfway, Isle of Sheppey, Kent.
Lewis, E., F.R.E.S. (952), 8 Parry Rd., London, S.E. 25. (C.)
Lewis, Rev. E. S. (373), Berwyn, Rhuddlan, Flintshire. (L.)
Lewis, M. E. G. (2071*), 153 Doncaster Rd., Southmead, Bristol, 7. (L.)
Lewis, R. (734), c/o 78 Lascelles Ave., Withernsea, Yorks. (O., Bot.)
Ling, R. B. (1885), 6 Old Forge Way, Sidcup, Kent. (L.)
Lisney, Dr. A. A., M.A., M.D., F.R.E.S. (315), Dune Gate, Clarence Rd., Dorchester, Dorset. (L., ML.)

Little, J. C. (563), 70 Langley Way, West Wickham, Kent. (L. including exot.)
Lloyd, L. C., F.L.S., M.B.O.U. (770), Shackerley, Wenlock Rd., Shrewsbury, Shropshire. (E.)
Lloyd, R. W. (445), The Grange, Bampton, Oxford. (C.)
Lobb, J. (1608), Fernbank, Yarborough Rd., Wroxall, I. of Wight. (gen. ent.)
Locke, M. (1118), 36 Ainsdale Rd., London W.5. (L., Bot., Mic., Z.)
Lockington, N. A. (1421), 23 Stonards Hill, Loughton, Essex. (C., H.)
Lofting, R. G. (1950), Lodge Cottage, Preston, Uppingham, Rutland. (L.)
Lomas, B. (1984*), 184 Trafalgar St., Ashton-under-Lyne, Lancs. (L., O.)
Long, W. H. (1565), Ashleigh, Limes Rd., Tettenhall, Wolverhampton, Staffs. (L.)
Longfield, Miss C., F.R.E.S. (1039), 11 Iverna Gdns., London W.8. (O.)
Lorimer, Dr. J. A. (576), 23 King's Ave., Buckhurst Hill, Essex. (L.)
Lorimer, R. I. (600), Braeside, Pine Grove, London N.20. (L.)
Lothian, D. M. (964), Backhill Cottage, East Hallside, Cambuslang, Glasgow. (L., C.)
Lovett, J. F. (1760), 26 Spensley Rd., Westoning, Bedford. (gen. ent. esp. C.)
Ludlam, R. (1519*), Pippins, Wymers Wood Rd., Burnham, Bucks. (L.)
Lydgate-Bell, H. G. (1176), 28 Hastings Way, Croxley Green, Herts. (L.)
Lyon, F. H. (1026), Green Headland, Sampford Peverell, Tiverton, Devon. (L.)
Mabbott, T. W. (1986), 20 Forth St., Grangemouth, Stirlingshire. (agric. ent.)
Mackworth-Praed, Lt. Col. C. W. (392), Castletop, Burley, Hants. (ent., Z., ornith.)
McCormick, W. J. (1736), Winchester Ave., Larkstone Terrace, Ilfracombe, Devon. (L.)
McCrae, A. W. R. (1144), Oak Lawn, Gordon Ave., Stanmore, Middx. (C., L.)
McLaughlan, E. A. (1934*), 35 Lindsey Rd., Dagenham, Essex. (C., L.)
Maclaurin, A. M. (1282), Oldhallhouse, Kilmacolm, Renfrewshire. (gen. ent.)
McNally, P. (1429), 11 Tennant Rd., Paisley, Renfrewshire.
Maggs, P. (244), Clay Copse, Sway, Lymington, Hants. (L.)
Major, A. P. (1117), 21 Tufton Rd., Rainham, nr. Gillingham, Kent. (NH., gen. ent.)
Makings, P. (1892), 38 Oxford Gdns., London, W.10. (L., H.)
Malham Tarn Field Centre (1595†), nr. Settle, Yorkshire. Com. to P. Holmes, M.A., Warden. (gen. ent.)
Manly, G. B. (427), 72 Tenbury Rd., King's Heath, Birmingham. (L.)
Manning, S. A., F.L.S., F.R.S.A. (1774), 4 Patterson Rd., Norwich, Norfolk. (H., Insect Galls)
Mansfield, M. J. (134), 5 Chigwell Rd., Bournemouth, Hants. (gen. ent.)
Manson, A. (1727), 13 Park Ave., Portobello, Midlothian. (L.)
Markham, J. (2000), 10 Cavendish Rd., Edgbaston, Birmingham, 16. (L.)
Marsden, C. (1904*), 11 Worrall Drive, Worrall, Sheffield, Yorks. (L.)
Marson, J. E., F.Z.S., F.R.E.S. (1390), 35 High Park Drive, Heaton, Bradford, Yorks. (pond life, Arachnida)
Martin, E. L. (801), 9 Devonshire Rd., Harrow, Middx. (L., esp. ML., T.)
Martin, P. M. (1741*), 310 Cowley Rd., Oxford. (L.)
Mason, C. (2028), Twyford School, Winchester, Hants. (Silkmoths)
Mason, J. M. (2033*), 77 Trejon Rd., Old Hill, Staffs. (L.).
Mason, N. P. (1758*), Glengarry, Cedar Rd., Farnborough, Hants. (L.)
Maxwell, Sir Reginald M., M.A., G.C.I.E., K.C.S.I. (1852), Barford House, St. Mary Bourne, Andover, Hants. (L.)
May, J. T. (1775), Homeland, Beech, Alton, Hants. (L.)
Mayne, J. (1874*), 191 Bitterne Rd., Southampton, Hants. (L.)
Mead, W. J. (1578), 58 Cedar Lawn Ave., Barnet, Herts. (L.)
Menneer, R. R. (1947), 12 Fairview Rd., The Avenue, Wilton, Salisbury, Wilts. (L. esp. *Maniola jurtina*, Meadow Brown)
Menzies, I. S. (585), Eden Roc, Florida Rd., Ferring-by-Sea, Sussex. (L., ML., C., H.)

Messenger, J. B. (1783*), 1 Chaucer Mansions, Queen's Club Gardens, West Kensington W.14. (L.)
Michael, P. (748), 19 Green Lane, Shortheath, Farnham, Hants. (NH., M., Ichthyology, L.)
Michaelis, H. N. (1216), 10 Didsbury Park, Manchester 20. (L. including Indian R.)
Midlen, C. (1769*), Glentorr, Bideford, N. Devon.
Miles, B. R. (1613*), 303 Selsdon Rd., South Croydon, Surrey. (L.)
Millar, A. (1949), 26 Museum Chambers, Bury Place, W.C.1. (gen. ent.)
Millard, W. J. (80), 8 York Place, Clifton, Bristol 8. (gen. ent., L., pond life)
Miller, S. W. (1287), 5 Bedford Terrace, Portobello, Midlothian, (L., C.)
Millon, R. (1496), 73 Rue Jenner, Fives-Lille, Nord, France. (gen. ent.)
Mills, D. N. (1893), 3 Burnside Rd., West Bridgford, Nottingham. (C.)
Mills, G. (1876), 120 Greengate St., Oldham, Lancs. (C., L., O.)
Mills, H. C. (1228), Thorneycroft, Greenway, Hutton Mount, nr. Brentwood, Essex. (H., L.)
Mitchell, A. R. (1750*), 11 Old Oak Rd., Acton W.3. (L.)
Mitchell, Miss E. M. (1814), Clay Cross Vicarage, Chesterfield, Derbyshire.
Mitchell, S. C. (1945), 22 Ashley Rd., Bingley, Yorks. (gen. ent.)
Molyneaux, S. R. (1180), 40 Coxford Rd., Maybush, Southampton, Hants. (gen. ent. esp. C.)
Moody, N. H. (693), 119 Southampton Rd., Ringwood, Hants. (L.)
Moon, H. N. (1652), 6 Salutation Rd., Darlington, Durham. (gen. ent.)
Moore, D. M. (1248), Thom Hill House, Prospect Place, Barnard Castle, Co. Durham. (L., gen. ent.)
Moore, J. (146), Kemerton Lodge, nr. Tewkesbury, Glos. (L.)
Moppett, A. A., B.A. (1841), 39 Fairdale Gdns., Hayes, Middx. (gen. ent.)
Morgan, H. G., M.A. (90), Staplake Mount, Starcross, Exeter, Devon. (Hem. esp. Aphididae, aq. Het., E., gen., econ., and agric. ent.)
Morgan, J. R. (1515), 12 The Grove, Ringstead, Kettering, Northants. (L.)
Morris, M. (1678), 9 King's Ave., Lowton-St-Mary's, nr. Warrington, Lancs.
Morris, W. H. H., M.P.S. (2025), 66 Wells Rd., Penn, Wolverhampton, Staffs. (L., esp. rearing)
Morrison, I. D. (1985*), 14 Cleveland Ave., Radipole, Weymouth, Dorset. (C., Hem.)
Morrison, W. H. (2107*), 9 Barclay Terrace, Edinburgh 10. (C.)
Morton, J. K. (522), The Manse, The Avenue, Birtley, Co. Durham. (L.)
Morton, M. R. (1898*), Langleys, West Lane, East Grinstead, Sussex. (L.)
Morton, Miss M. E. (924), 20 Leeds Rd., Barwick-in-Elmet, Leeds, Yorks. (L., mic.)
Moss, B. T. M. (1335), 12 The Bungalows, Windmill Rd., Halstead, Essex. (H., L.)
Mounter, J. W. (1946), 85 Acre Lane, London S.W.2. (L., exot. C.)
Mulliner, A. E. (1922), "Arlingham," 35 Fairview St., Cheltenham, Glos. (gen. ent., esp. L., O.)
Murray, Dr. H. (177), Ashbourne, Clonmel, Co. Tipperary, Eire. (L.)
Myatt, G. (1767), School House, Springfield Rd., Blackheath, Birmingham. (L.)
Narbeth, B. (1894*), Culner House, 36 Linden Rd., Bedford. (L.)
Nathan, L. (428), 19 Monton St., Moss-side, Manchester 14. (ent., L.)
Nature Conservancy, The (1901†), 91 Victoria St., S.W.1. Com. to Lt. Col. W. B. L. Manley.
Neal, E. G., B.Sc. (467), 2 Bishop's Mead, Kingston Rd., Taunton, Som. (L., C., Hem., P.)
Nelson, J. M. (1751), The Shieling, Castletown, Isle of Man. (gen. ent.)
Ness, A. R. (549), 15 Homefield Ave., Newbury Park, Ilford, Essex. (L.)
Nestel, B. L. (1362), 31 Filey Ave., London N.16. (gen. ent., L.)
Nevile, H. R. (2027), The Rectory (Top Flat), Leire, nr. Rugby, Warks. (gen. ent. esp. R.)
Newman, E. T. (1621), Hollyhocks, Guildford Rd., Cranleigh, Surrey. (R.)
Newman, L. H. (503), The Butterfly Farm, Bexley, Kent. (L.)

Newson, P. (842), 19 Rowlands Keld, Hutton Gate, Guisborough, Yorks. (L.)

Newton, Dr. A. H., M.B., Ch.B., F.R.E.S. (1140), The Provincial Govt. Hospital, Ladysmith, Natal, S. Africa. (O., C.)

Newton, J. (439), 11 Oxleaze Close, Tetbury, Glos. (L.)

Nisbet, K. J. (1820), Invergarry, Medeira Walk, Church Stretton, Shropshire. (L., P. of insects)

Norman, Dr. T. (68), Seleng T.E., Seleng Hat P.O., Upper Assam, India. (H., L., D., parasites of L.)

North, R. S. (654), 41 Buckingham Rd., Aylesbury, Bucks. (L.)

Northern Naturalists' Club (1828†). 80 Fonthill Rd., Aberdeen. Com. to Hon. Sec. J. B. Coutts.

Nott, J. C. (1913), 1 Buckleigh Ave., Merton Park, London S.W.20. (L.)

Odell, B. J. (2054*), 30 Allandale Crescent, Potters Bar. Middx. (L.)

Ogden, J. B. (1580), 158 Dowsett Rd., London N.17. (L., Genetics)

Ogden, J. S. (1070), Argwendon, Green St., Sunbury-on-Thames, Middx. (L., C.)

Ollevant, D. (1514). 172 Stockwell Rd., London S.W.9. (L.)

O'Rourke, F. J. (191), Dept. of Entomology and Parasitology, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool, 3. (H.)

Orrell, M. J. (1974*), 87 St. Helens Rd., Leigh, Lancs.

Otter, G. W. (475), Southwood. Blandford Rd., Broadstone, Dorset. (L., C., T.)

Ottewell, B. (1856*), 100 Scalford Rd., Melton Mowbray, Leics. (L.)

Owen, H. T. C. (2034), 29 Grovsnor Place, Jesmond, Newcastle-upon-Tyne 2. (Hem., H., physiology)

Owers, D. E. (1319), 114 Demesne Rd., Wallington, Surrey. (L., C., O.)

Owston, E. (1334), 18 College Gardens, New Malden, Surrey. (L.)

Packer, R. (1896*), 62 Oakfield Rd., Clifton, Bristol 8.

Page, E. S. (598), The Gables, Cookham Dean, Berks. (L.)

Page, R. L. S. (742), Abbots Gate, Falcon Gdns., Minster, Sheppey, Kent. (gen. ent.)

Page, R. O. M. (2068), County of Stafford Training College, nr. Stafford. (B.)

Palmer, J. L. (900), "Trethias," Lidden, Penzance, Cornwall. (Organisation of entomological and phenological returns)

Palmer, R., F.R.E.S., F.Z.S. (1815), Hollydale, Aspley Guise, Bletchley, Bucks. (agric., aq., H., mic., O., ornith., Orth.)

Parker, B. N. (1981*), Oakengates, Ratby Lane, Kirkby Muxloe, Leics. (L., C.)

Parker, E. (865), Feathercombe, Hambledon, Godalming, Surrey. (M.)

Parker, H. (738), 21 Park Way, Southwick, Sussex. (gen. ent., NH.)

Parker, R. A. B. (1535), 63 Rainham Rd., Gillingham, Kent. (gen. ent.)

Parmenter, L., F.R.E.S., (895), 94 Fairlands Ave., Thornton Heath, Surrey. (D.)

Parrett, F. I. (1993*), 3 Garden Close, Banstead, Surrey. (R.)

Parrett, M. (1991*), 3 Garden Close, Banstead, Surrey. (R.)

Parry, D. E., (1916*), 15 Warwick Rd., Southampton, Hants. (L., C.)

Parsons, I. D. (449), The Old School Farm, Baas Manor, Broxbourne, Herts. (L.)

Parsons, R. E. R., F.R.E.S. (1512), Woodlands Lodge, Woodlands Close, Ottershaw, Surrey. (L.)

Parsons, T. (1513), 28 St. John's St., Ogmore Vale, Bridgend, Glamorgan. (L.)

Payne, Miss D. A. (1902), The Broadway House, Llandrindod Wells, Radnorshire. (gen. ent.)

Payne, J. H. (353), 10 Ranelagh Rd., Wellingborough, Northants. (L.)

Pearce, Rev. E. J., M.A. (796), St. Teilo's Priory, Church Terrace, Roath, Cardiff. (C. esp. Haliplidae, Pselaphidae, distribution)

Pearson, A. E. G. (1677), 18 Abbotswood, Guildford, Surrey. (C., mic.)

Pearson, P. D. (2051*), Brierlea, Stream Rd., Kings Winford, Staffs. (O.)

Pearson, R. (2077*), Minton's Folly, Batcombe, Cerne Abbas, Dorset. (L. Brit. & exot.)

Peel, D. H. (1218), 7 Bushway, Dagenham, Essex. (R. British and exot.)

Pegg, C. A. S. (1994*), Brooklands, Langport, Som. (L., O.)

Pelham-Clinton, E. C. (1399), 74 Grange Loan, Edinburgh 9. (L.)
Pemberton, M. J. (2038*), 15 Bere Rd., Wareham, Dorset. (L.)
Pennock, E. T. (82), 16 Drive Rd., Linthouse, Glasgow S.W.1. (L.)
Penrose, R. J. (1467*), 86 Mildred Ave., Watford, Herts. (L.)
Percy, A. A. (1763), Bourock, Dunlop, Kilmarnock, Ayrshire. (agric. ent.)
Pereira, E. A. (2064*), Caversham Place, Emmer Green, Reading, Berks. (L., bees)
Perrins, C. M. (1133*), Thursday Cottage, Ember Lane, Esher, Surrey. (L.)
Petty, George R. (1113), 106 King's Rd., Rayners Lane, Harrow, Middx. (gen. ent.)
Petty, K. (1561), 21 Princess Cres., Bolton, nr. Bradford, Yorks. (gen. ent., L.)
Pickard-Cambridge, D. F. (2052), Blue Haze, P.O. Umhlanga Rocks, North Coast, Natal, S. Africa. (C., O., Phasmidae)
Phillips, J. W. (2108*), 49 Moreton End Lane, Harpenden, Herts. (L.)
Pickering, E. C. (1243), 31 Alexandra Drive, Surbiton, Surrey. (H.)
Pickett, A. H., L.D.S., D.M.D. (37), 32a Chatsworth Rd., Brighton, Sussex. (L.)
Pilcher, T. F. (1914), "Bramacre," Stevenage Rd., Knebworth, Herts. (Silkmoths)
Pitman, H. J. (1967), 16 Broad View, Dartington, nr. Totnes, S. Devon. (L., O.)
Platts, J. H. (515), Lawn Cottage, Sway Rd., Brockenhurst, Hants. (L.)
Podmore, Miss J. S. (1607*), 23 King's Close, Wilmslow, Cheshire. (gen. ent.)
Ponchaud, A. J. (1887), 38 Southampton Rd., Ringwood, Hants. (L.)
Pontin, A. J. (1670), 15 Southdale Rd., Summertown, Oxford. (L., O., C., genetics)
Pook, J. (1596*), The Gate, Stroud Farm Rd., Holyport, nr. Maidenhead, Berks. (L.)
Poole, K. H. (133), 55 The Boulevard, Weston-super-Mare, Somerset. (L.)
Poole, T. B. (1681), 19 Lynton Ave., Toller Lane, Bradford, Yorks. (gen. ent., H. Aculeata)
Pople, L. (1697), 165 Sibthorpe Rd., Horn Park, Lee S.E. 12. (L., C.)
Port, M. H. (799), 31 Pinner View, Harrow, Middx. (Orth., L.)
Porter, D. I. (1759), 83 Pasture Rd., North Wembley, Middx. (L., ornith.)
Pow, A. (39), 5 Dakers Place, Hawick, Roxburghshire. (L.)
Pratt, C. B. (784), 1 West Ham Lane, London E.15. (L.)
Pratt, P. W. (1908), 49 Beale St., Dunstable, Beds. (L.)
Preston, D. (2085*), 10 Henry St., Shiney Row, Houghton-le-Spring, Co. Durham. (gen. ent., B.)
Prevett, P. F. (1802), Station House, British Railways, Mitcham Junction Station, Surrey. (C.)
Price, L. (1478), "Springdale," Rodborough Ave., Stroud, Glos. (L., C.)
Prichard, R. (460), 4 Woodcroft Lane, Bebington, Cheshire. (L., ML.)
Pringle, J. P. S. (2094*), 42 Aldenham Ave., Radlett, Herts. (L., H., D.)
Prior, J. G. (2031), 7 Coates Place, Edinburgh. (L. esp. H.)
Pullen, G. H. (1622), 36 Firlands Scott Rd., Bishops Stortford, Herts. (C., Orth., mic.)
Purvis, L. E. (941), "One Oak," Hale Rd., Hale Barns, Cheshire. (L.)
Putnam, C. D. (1383), "Davenants," Sible Hedingham, Halstead, Essex. (gen. ent.)
Quainton, J. T. (2074*), 58 Chester Way, London, S.E.11. (R.)
Rae, A. G., B.Sc., M.R.C.V.S. (1789), Aberure, Boroughbridge, York. (L.)
Ramsay, F. J. (837), Old Manse, Kilbarchan, Renfrewshire. (gen. ent.)
Ramsden, E. (130), 2 Temple Rd., Bishopthorpe, York. (L.)
Randall, M. C. (535), 64 Mount Pleasant Rd., Chigwell, Essex. (L.)
Ranger, J. E. A. (1002), 54 Cherry Crescent, Brentford, Middx. (L., Locusts)
Ransom, F. E. (1810), 47 York Rd., Bury St. Edmunds, Suffolk. (C., L.)
Raven, Leslie (135), 196 Culson Rd., Coventry, Warwickshire. (L.)
Rawlinson, D. J. (2008*), 11 Lynton Ave., Harborough Rd. North, Kingsthorpe, Northampton. (L.)
Raybould, J. N. (1302), 8 Ember Farm Ave., E. Molesey, Surrey. (gen. ent.)

Rayner, A. (1818*), "Evans House," Sedbergh School, Sedbergh, Yorks. (gen. ent.)

Rayner, P. (1998*), 1a Stonegreen Hall, Mersham, nr. Ashford, Kent. (C., D., breeding L.)

Read, E. C. (855), Stoney Corner, Meopham, Kent. (NH.)

Read, F. D. B. (1721*), Pease Close, Throwleigh, nr. Okehampton, Devon. (L.)

Read, Miss M. J. L. (1686*), Hawthorn, Longfield Ave., New Barn, Longfield, Kent. (gen. ent., NH.)

Read, R. (1782), 43 Holly Terrace, Hensingham, Whitehaven, Cumberland. (L., gen. ent.)

Readwin, B. (820), 36 Warley Hill, Brentwood, Essex. (gen. ent.)

Redgrave, A. C. R. (1639), 14a The Broadway, Portswood, Southampton, Hants. (L., ML.)

Redgrove, D. R. (1842*), Orchard End, Albion Rd., Kingston, Surrey. (L.)

Reid, J. F. (1821), 19 High Street, Leighton Buzzard, Beds. (L.)

Renfrew, C. (1507), Lanhill, Bourton-on-the-Water, Glos. (L., gen. ent.)

Revell, A. L. (1827*), 26a Meads St., Eastbourne, Sussex. (L.)

Reynolds, W. E. (1350*), 8 Clifton Rd., Squires Lane, London W.3. (L.)

Richardson, Austin (483), Beaudesert Park, Minchinhampton, Glos. (L.)

Richardson, N. A. (431), 1 The Crescent, Haversham, Bucks. (L.)

Riley, D. A. (1477*), 25 Lombard Ave., West Southbourne, Bournemouth, Hants. (L.)

Riley, H. (1819), Great Moulton, Norwich, Norfolk. (gen. ent.)

Ritchie, J. Y. (1973), 21 Clinty Rd., Forth, Lanark.

Ritson, William (1112), 12 West St., Winwick Rd., Warrington, Lancs. (ornith., gen. ent., esp. C., Orth.)

Rivers, C. F. (1443), 250 Shepherds Lane, Dartford, Kent. (L.)

Roberts, S. F. (216), 66 Hoads Wood Rd., Hastings, Sussex. (C.)

Roberts, W. N., B.Sc. (Econ.), F.R.Econ.S. (77), 48 Bishops Mansions, Bishop Park Rd., London S.W.6. (L., gen. ent.)

Robertson, A. W. (323), "Ranworth," St. Lawrence Drive, Eastcote, Middx. (E.)

Robertson, J. A. (224), The Gardens, Rotherby, Melton Mowbray, Leics. (L.)

Robinson, Cyril A. (1085), 155 Regent St., Kettering, Northants. (L., C., O.)

Robinson, H. S. (1518), Lower Farrington, Alton, Hants. (L.)

Robson, J. P. (44), 10 Vane Rd., Barnard Castle, Co. Durham. (L., ML.)

Roe, W. D. (1671), 43 Kirkeley Cliff Rd., S. Lowestoft, Suffolk. (C., E.)

Rogers, P. J. (2049), 23a Girdlers Rd., West Kensington, W.14. (L.)

Rogerson, J. L. (1987), 30 First Ave., Coniston, Ontario, Canada. (L.)

Rogerson, P. G. (2109*), Barningham House, Bury St. Edmunds, Suffolk. (L.)

Rogerson, S. (1398), 10 Shelley Ave., Sutton Trust Estate, Hull. (L.)

Rollo, D. G. (1996*), Pleasant Hill, 57 Kings Rd., Berkhamsted, Herts. (L. esp. larvae)

Rooker, H. J. (1650*), "Birchfield," Weeping Cross, Stafford. (gen. ent., ornith., aq.)

Roper, P. (1713*), 5 The Green Walk, Chingford, E.4. (D., ornith., L., H.)

Rossner, (S/L A. (1611), 14 Anglesey Gdns., Carshalton Beeches, Surrey. (L.)

Rothschild, G. H. (2002*), 20 Redford Ave., Wallington, Surrey. (gen. ent.)

Roudier, A. J. (1294), 6 Square Georges Lesage, Paris 12e, France. (C., L.)

Row, Capt. A. W. H. (1316), 3 Down Rd., Rodwell, Weymouth, Dorset. (L., C., H.)

Rowden, A. O. (405), Rydon Crest, Countess Wear, Exeter, Devon. (gen. ent.)

Rowell, C. H. F. (1865), 4 North Lane, Elwick, West Hartlepool, Co. Durham. (L., H., N.)

Rudland, W. L., F.R.E.S. (249), 97 Addison Rd., Reading, Berks. (L., ML., H.)

Rumsey, F. W. (1886), 46 Warren Rd., Banstead, Surrey. (L.)

Russell, S. G. Castle (119), 5 Bridge Rd., Cranleigh, Surrey. (R. vars.)

Russell, W. (412), 69 Lochlea Rd., Glasgow S.3. (L., camouflage)

Russell, W. E. (1525), 741 Lincoln Rd., Peterborough, Northants. (L.)

Rutherford Grammar School (Boys) (1830†), Newcastle-on-Tyne. Com. to W. W. L. Halkier. (gen. ent.)

Ruthven, D. J. (1780*), "Mayfield," North Walsham Rd., Sprowston, Norwich, Norfolk. (gen. ent.)

St. Edward's School (1405†), Oxford. Com. to A. M. Emmet, M.A. (gen. ent.)

Sandy, D. G. (1785), 26 Thorneyfields Lane, Stafford. (C., L.)

Sangster, D. R. (578), 69 Leadside Rd., Aberdeen. (L.)

Sargent, H. B. (1189), 8 Bay View Terrace, Porthleven, Cornwall. (breeding L., Bot. of county)

Saundby, Air Marshall Sir R., H.M.S., K.B.E., C.B., M.C., D.F.C., A.F.C., F.R.E.S. (1817), Oxleas, Burghclere, nr. Newbury, Berks. (L., local lists and museums.)

Savidge, J. P. (2041), Millwood, Spidal, Wirral, Cheshire. (O., L., D., H., Hem., Orth., C.)

Scott, D. G. (534), Ladymead, Berkley March, nr Frome, Som. (L.)

Scott, O. S. (1762*), 15 Cromwell Rd., Boscombe East, Bournemouth, Hants. (L.)

Scott, Peter (1163), 28 Cragside Crescent, Hawksworth Estate, Leeds 5.

Scott, W. (1403), 6 Crocketts Ave., Crocketts Rd., Birmingham 21 (R.)

Scudder, G. G. E. (2032*), 3 Six Acre cottages, Fawkham, Dartford, Kent. (gen. ent., L., C., Z.)

Seabrook, W. P. (263), St. Barnabas, Frinton-on-Sea, Essex. (L.)

Seago, J. H. (1466*), Ash Tree Cottage, 105 Racecourse Rd., Swinton, nr. Mexborough, Yorkshire. (L.)

Searle, H. R. (1926), 17 Agnes Ave., Leigh-on-Sea, Essex. (H.)

Shapland, J. D. (548), Foamite Ltd., 235-241 Regent Street, London W.1 (L., mic.)

Shaw, H. K. Airy, B.A., F.L.S., F.R.E.S. (545), Christian Fellowship Centre, 13 Honor Oak Rd., S.E.23. (Orth., Het., C., E., Bot., NH. Socs.)

Shaw, J. P. (1204), The Mental Hospital, Weyburn, Sask., Canada (L.)

Shaw, M. W. (911), Dept. of Advisory Entomology, Marischal College, Aberdeen. (gen. agri. ent. esp. Fruit pests)

Shaw, R. G. (1486*), 5 Burnham Rd., London E.4. (L.)

Sheppard, P. M. (291), Dept. of Zoology and Comparative Anatomy, University Museum, Oxford. (L., gen. ent.)

Shield, Donald H. (1156), The Hall, Badwell Ash, Bury St. Edmunds, Suffolk. (L.)

Shobbrook, R. A. (2040*), 34 North St., Ashburton, Devon. (L.)

Short, M. A. (1770*), 4 Osborne Rd., Morecambe West, Lancashire. (L.)

Showler, A. J. (1442), 19 Harvel Crescent, London S.E.2. (L.)

Siggs, L. W. (243), 10 Repton Road, Orpington, Kent. (L.)

Simmonds, S. P., B.Sc. (2009), 49 Iveson Approach, Leeds, 6, Yorks. (Het., C., Thysanoptera, Aphidae)

Simpson-Scott, C. J. (1938), 92 Brockenhurst Ave., Worcester Park, Surrey. (gen. ent.)

Sinclair, F. G. (2113), 12a Hayes Court, New Park Rd., S.W.2. (H.)

Skidmore, J. (1705*), 240 Grains Rd., Shaw, Lancs. (L., C.)

Skillen, S., M.Sc. (2104), 29 Ormonde Park, Finaghy, Belfast, N. Ireland. (gen. insect B., esp. as aid to teaching NH., B., ornith.)

Sladen, P. A. (2058*), 79 Dell Rd., King's Norton, Birmingham, 30. (L.)

Slatter, A. J. (131), Public Health Dept., Port Moresby, Papua.

Smith, A. E. (2053*), 12 Hawes Mount, Little Horton, Bradford, Yorks. (L.)

Smith, D. J. (1324), 16 Roylesden Crescent, Chester Rd. North, Sutton Coldfield, nr. Birmingham. (L., C., D.)

Smith, D. S. (1755*), 87 Willingdon Rd., Eastbourne, Sussex. (L., O.)

Smith, E. K. (178), 13 Salisbury Rd., Andover, Hants. (L., veterinary ent.)

Smith, E. W. (1207), 93 Craithie Rd., Town Moor, Doncaster, Yorks. (L.)

Smith, J. A. J. (1654), 183 Winslem Rd., Bradford-on-Avon, Wilts. (L., gen. ent.)

Smith, J. S. (1863*), The Rhyddings, Ridgebourne Rd., Shrewsbury. (gen. ent.)

Smith, Kenneth G. V., M.I.Biol., F.R.E.S. (897), Entomology Dept., National Agriculture Advisory Service, "Woodthorne", Wolverhampton, Staffs. (D., gen. and econ. ent., NH., B.)

Smith, K. J. (1289*), 21 The Mount, Cheylesmore, Coventry, Warks. (L.)
Smith, M. (2003*), 58 Mowson Lane, Worrall, nr. Sheffield, Yorks. (L.)
Smith, P. Siviter (250), 21 Melville Hall, Holly Rd., Birmingham 16. (L., P.)
Smith, R. A. (1958), 35 Theydon St., London, E.17. (C.)
Smith, S. F. (1849), 69 Standard Ave., Coventry. (L.)
Smith, S. Gordon, F.L.S., F.R.E.S. (478), Estyn, Boughton, Chester. (L.)
Smith, T. H. W. (1462), 13 Oxford St., Rugby, Warks. (L.)
Smith, W. R. (1641), 105 King Edward Ave., Southampton. (L.)
Snell, B. B. (419), Woodsome, Plymyard Ave., Bromborough, Cheshire. (L., ML.)
South, A. (1586*), "Ikaya," Frindsbury Hill, Strood, Rochester, Kent. (R., aq.)
Southville Boys' Insect Club, The (1567†), Southville Secondary School, Ashton Gate, Bristol 3. Com. to G. E. Lovell. (L. esp. Silkmoths)
Southwood, T. R. E., F.R.E.S. (1051), Parrock Manor, Old Road East, Gravesend, Kent. (Het., C., E.)
Spearman, R. I. C. (921), Oaks Bungalow, Oaks Ave., London S.E.19. (B., NH, social insects)
Sperry, J. L. (1434), 3260 Redwood Drive, Riverside, California, U.S.A. (L.)
Spink, G. Frederick (1386), 237 Leigham Court Rd., London S.W.16. (C.)
Spittles, C. E. (1483), 95 Tring Rd., Aylesbury, Bucks. (L.)
Stafford Training College, The County of (1646†), Nelson Hall, nr. Stafford.
Stallwood, B. R. (1547), 19 Southfield Gdns., Strawberry Hill, Twickenham, Middx. (L., O.)
Stammers, P. S. (1649), 49 Ellerby St., Fulham, S.W.6. (L.)
Steel, J. A. (1333*), 127 King George's Rd., Ware, Herts. (L.)
Stephenson, R. C. (1962), 409 Queensbridge Rd., London, E.8. (L.)
Stidston, Eng. Capt. Stanley T., R.N., J.P., F.R.E.S., M.S.B.E. (40), "Ashe," Ashburton, Newton Abbot, Devon. (L.)
Stokes, Capt. G. E. (319), The Brambles, Roe Green, Hatfield, Herts. (L.)
Stokes, H. G. (828), 12 Roman Rd., Salisbury, Wilts. (Hem., C.)
Storer, T. A. (1254). 586128 A/A Storer, T. A., C Flight, B Squadron, No. 1 (Apps.) Wing, R.A.F., Cranwell, Sleaford, Lincs. (L.)
Storey, W. H. (277), Fairstead, Long Rd., Cambridge. (L.)
Stroud, R. W. (1911*), 12 Sheridan Terrace, Whitton Ave. West, Northolt Park, Greenford, Middx. (L., O.)
Struthers, F. M. (1696), 143a, Gander Green Lane, Cheam, Surrey. (L.)
Stuart, A. N. (2066*), Fairmile, Oathall Rd., Haywards Heath, Sussex. (L., aq. ent.)
Sturdy, D. A., B.Sc. (988), 1 Waldringfield Court, Braintree Rd., Felsted, Essex. (D., O., agric. ent.)
Sturt, P. G. (2012*), Sherwood, 8 Grasmere Rd., Boscombe, Hants. (L.)
Stutt, P. D. (1848*), 24 Westcote Rise, Ruislip, Middx.
Suffield, N. L. (1157), 8 Park Place West, Sunderland, Co. Durham. (gen. ent.)
Sutton, F. R. (538), 42 Fairfield Drive, London S.W.18). (L.)
Sutton, G. R. (237), 6 Kenilworth Gdns., Loughton, Essex.
Swain, A. M (1409), 253 Crescent Drive, Petts Wood, Kent. (L.)
Swain, F. A. (1418), 55 Eaton Rd., Orpington, Kent. (L.)
Swain, H. D., M.A., F.R.E.S. (1800), 47 Dryburgh Rd., Putney. (L., H., C., Hem.)
Swann, E. L. (882), 282 Wootton Rd., King's Lynn, Norfolk. (Bot., C.)
Syms, E. E., F.R.E.S. (406), 22 Woodlands Ave., London E.11. (P., gen. ent., breeding)
Tailby, S. R., B.Sc., A.R.I.C. (636), 33 Alexandra Drive, Surbiton, Surrey. (L.)
Tailby, T. W. (1975), 56 Edgehill Rd., Leicester. (gen. ent.)
Talbot, de Malahide, Lord (384), 2 Devonshire St., London, W.1. (L.)
Tampion, W. (1694*), 21 Romsey Rd., Shirley, Southampton, Hants. (C., L., gen. ent.)
Tams, W. H. T., ‡, Dept. of Entomology, British Museum (Nat. Hist.), London S.W.7. (L., P., Arachnida)
Tanner, T. C. (1701), Ivy House, Meole Brace, Shrewsbury. (gen. ent.)

Tanton, M. T. (1890*), "Normandy," Lichfield Rd., Dunstall, Burton-on-Trent, Staffs. (L.)
Tappenden, G. B. (1682), "Roma," Kempshott Lane, Worting, Basingstoke, Hants. (L.)
Tayler, A. G. (433), Whiteshoots Hill, Bourton-on-the-Water, Cheltenham, Glos. (gen., ent.)
Taylor, A. S. (1510), 364 Burley Rd., Leeds, 4. (C., L.)
Taylor, C. J. (2055*), 47 Rawlinson Rd., Southport, Lancs. (breeding L., esp. Hawkmoths & exot.)
Taylor, G. B. (2016), 7 Candover Close, Harmondsworth, West Drayton, Middx. (L.)
Taylor, H. T. (1943), 9 Queens St., Stamford, Lincs. (R. Heterocera)
Taylor, L. R. (441), 5 The Manor, Rothamsted, Harpenden, Herts. (L.)
Taylor, M. F. (1725*), 186 Holburne Rd., Blackheath, London S.E.3. (L., breeding)
Taylor, M. J. (1209), 51 Grange Rd., Kenton, Harrow, Middx. (L.)
Taylor, P. G., F.R.E.S. (719), 51 Woodlands Drive, Watford, Herts. (L., agric. pests, B., E., M., cave fauna)
Taylor, R. C. (1528), Vinnicks Cottage, Pill Hill, Highclere, nr. Newbury, Berks. (L.)
Tebbs, H. F. (1897), 38 Cavendish St., Peterborough, Northants.
Templeton, R. (1794*), 14 Ellisland Crescent, Spittal, Rutherglen, Lanarkshire. (L., M., NH.)
Tesch, L. R. (‡), King's School, Rochester, Kent. (L.)
Thom, C. F. (2080), 92 Stratford Rd., Stroud, Glos.
Thomas, B. R. (1709*), 2 Springfield Rd., Carmarthen, S. Wales. (L.)
Thomas, P. R. (1837), 21 Goat St., Haverfordwest, Pembs. (agric. ent.)
Thompson, R. T. (1825), 33 Downton Rd., Salisbury, Wilts. (L.)
Thornton, J. N. (1413), 123 Otley Old Rd., Leeds 6. (L., H.)
Thornton, R. (1891*), 51 Richlands Ave., Stoneleigh, Ewell. (L.)
Thorp., R. W. T., B.A. (1259), The Grange, Alnwick, Northumberland. (mic.)
Thorpe, H. J. (482), Perivale, Glenmore Lane, Quedgeley, Glos. (L., C., ornith.)
Thorpe, J. (1726), 77 Mount Pleasant, Woodley, Stockport, Cheshire. (Garden pests)
Todd, A. (1197), Wesley Villa, Thornley, Durham. (gen. ent.)
Tonge, R. J. (1615*), 123 Rickmansworth Rd., Watford, Herts. (L., Bot., NH.)
Townsend, A. L. (1691), P.O. Box 276, Nakuru, Kenya Colony, E. Africa. (L.)
Tozer, D. (36), 98 Copdale Rd., Leicester. (L., C.)
Tremewan, W. G. (940), Wheal Rose, Scorrier, Redruth, Cornwall. (L.)
Tribbeck, R. A. (1322), "Weston," Titchfield Rd., Stubbington, nr. Fareham, Hants. (gen. ent., esp. C., E.)
Trought, T., M.A., F.R.E.S. (1373), c/o Dept. of Agriculture, Amman, Jordan. (L.)
Trought, T. E. T. (1480), Kawanda Research Station, P.O.B. 265, Kampala, Uganda. (L., C., D.)
Turner, H. B. (341), Malverleys, Newbury, Berks. (L.)
Turner, H. J. (696), 33 Pine Ave., West Southbourne, Bournemouth. (L.)
Turner, J. W. (1401), 18 Fox Covert Rd., Werrington, Peterborough, Northants. (L.)
Turner, Sidney J. (1014), 2 St. Leonard's Place, Exeter, Devon. (mic., Arachnida)
Twyford, H. S. (1205), 52 Purley Oaks Rd., Sanderstead, Surrey. (gen. ent.)
Tysoe Church School (1888†), Tysoe, Warwickshire. Com. to E. E. Farbrother. (gen. ent.)
Tyssen, J. G. C. (1870), "Rock Spring," Bradfield, Sheffield 6. (H.)
Uffen, R. W. J. (1660*), 4 Vaughan Ave., Stamford Brook, London W.6. (L.)
Ure, Malcolm (1354*), Woodlands, Seymour Court Rd., Marlow, Bucks. (L.)
Usher, R. (1768*), 25 Moncktons Ave., Maidstone, Kent. (L.)
Valletta, A., F.R.E.S. (1879), 257 Msida Street. B'Kara. Malta. (L., O., Orth.)
Van Den Driessche, M. (2029*), 6 Oakwood Crescent, Winchmore Hill, N.21. (L., C.)
Vardy, C. R. (1414*) San Martino, Rushington Lane, Totton, Hants. (gen. ent.)
Vaughan-Roberts, R.E. (1410), Llys Athro, Llanarmon-yn-Iâl, Mold, (L., H, gen. ent.)
Ventom, M. G. (1733), 76a Stanlake Rd., Shepherds Bush, London W.12. (C.)
Vieujant, R. (898), 44 Avenue Georges Pètre, Brussels, Belgium. (C., H., L.)

Vigay, J. F. (1554*), 28 Tooting Bec Gdns., London S.W.16. (L.)
Vince, A. A. P. (588), 14 Church Hill, London N.21. (L., aq. C., glass-house pests)
Wacher, P. B. (2006), The Deanery, Chartham, Canterbury, Kent.
Waddington, L. G. F. (169), 8 Lawn Ave., Doncaster, Yorks. (L.)
Wade, D. (1104), 17 Waldegrave Ave., Holderness Rd., Hull, Yorks. (L., breeding, ornith.)
Wadsworth, J. H. F. (1672*), 48 Bunbury Rd., Northfield, Birmingham. (L. O.)
Wager, J. R. (181), 10 Henshaw Rd., Birmingham, Warks. (L. esp. R.)
Wakely, S. H. (1860), 26 Finsen Rd., Ruskin Park, S.E.5. (L., D., H.)
Walder, W. (102), 79 Livingstone Rd., Hove 3, Sussex. (L.)
Walding, H. J. (1673), 48 Freehold St., Northampton. (gen. ent.)
Walker, D. (2056*), 37 Wallace Rd., Loughborough, Leics. (L.)
Walker, G. T. (1737), Manor House, Whitewell, nr. Worksop, Notts. (L.)
Walker, Dr. J. A. (843), Highfield House, Highfield, Cheddar, Somerset. (L., ML.)
Walker, P. A. (1968*), Flat 3, Stanford Park, nr. Loughborough, Leics. (C., H., aq. ent.)
Walker, P. J. (856*), 25 Regal Way, Preston Hill, Harrow, Middx. (gen. ent.)
Wall, G. (554), Hafod, Merstham, Surrey. (L., C., ornith.)
Wallace, H. R. (318), 115 Abercrombie Rd., Fleetwood, Lancs. (L.)
Wallis, B. M. (1832), 72 The Downs, Altrincham, Cheshire. (L.)
Walsh, G. B., B.Sc. (24), 22 Stepney Drive, Scarborough, Yorks. (C., B., Hem.)
Walshe, Lt. Comdr. P. la B. (1834), First Floor Flat, 69 Hitchen Hatch Lane, Sevenoaks, Kent. (L.)
Walter, P. W. R. (1493*), 190 Carrhouse Rd., Hyde Park, Doncaster, Yorks. (L.)
Walton, A. M. (426), 275 Croxted Rd., London S.E.21. (L.)
Walton, R. S. (1925), Gipsy Hill Training College, Kenry House, Kingston Hill, Surrey. (L., ag. ent.)
Wanstall, P. J. (465), 54 Matlock Rd., Brighton 5, Sussex. (R., Mosquitoes)
Ward, E. A. J. (709), 6 High St. Swanage, Dorset. (L.)
Ward, J. P. C. (1440), 8 Neal Ave., Southall, Middx. (L.)
Ward, K. E. (1680*), 129 Strouden Rd., Winton, Bournemouth, Hants. (L.)
Ward, P. S. (1729*), 23 Schola Green Lane, Morecombe, Lancs. (L., H.)
Warren, Brian Bates (1358), 1 Madeira Rd., Streatham, S.W.16. (C., L.)
Warwick County Museum (1773†), The Market Place, Warwick. Com. to the Curator.
Warwick, Dr. R., B.Sc., Ch.B. (1823), Medical School, University of Manchester, Manchester 13. (L.)
Washington, R. (1766), Lynwood, Highfield Second Ave., Stockton Brook, Staffs. (L.)
Waterman, G. J. (1787), 6 Princes Ave., Greenford, Middx. (gen. ent., H.)
Watkins, S. S. A., A.C.G.I., B.Sc., M.I.E.E. (1728), 60 Station Rd., Birchington, Kent. (L., D.)
Watson, R. W. (752), 15 Halstead Rd., Bittern, Southampton. (L.)
Watson, Dr. T. T. B. (1735), 58 Oxford Gdns., London W.10. (L., Silkmoths).
Watson, W. A. (1757), Leach Farm, Division Lane, St Annes-on-Sea, Lancs. (gen. ent. esp. Moths)
Watts, W. J. (240), 42 Bramerton Rd., Beckenham, Kent. (C.)
Waugh, R. M. (845), 154 Newsome Rd. South, Huddersfield, Yorks. (gen. ent. esp. L.)
Weaving, W. (1930), 27 Agnes Ave., Leigh-on-Sea, Essex. (Anoplura, H. Parasitica, D.)
Webb, H. E. (736), 20 Audley Rd., London N.W.4. (L.)
Webster, D. (1966*), 92 Lindale Gardens S.S., Blackpool, Lancs. (L.)
Weddell, B. W. (701), 13 The Halve, Trowbridge, Wilts. (L., ML.)
Weeks, J. R. (1853*), "Cleyleat," 4 Bradford Rd., Combe Down, Bath, Som. (L.)
Weller, L. G. (1651), Yarrow, Ewhurst, Cranleigh, Surrey. (L.)
Weller, N. H. (2039*), 21 Caldecot Rd., London, S.E.5. (H., Phasmidae, spiders, gen. ent., Z.)
Wellington College Natural History Society (1537†), Crowthorne, Berks. Com. to C. H. Bulteal. (gen. ent.)
Wells, C. H. (1983), Cedar Bank, Watcombe Heights, Torquay, Devon. (L.)

Welti, A., F.R.E.S. (402), 34 Great St. Helens, London E.C.3. (L.)
West, D. C. (2105*), Taiping House, Whitemill Lane, Frome, Som. (L.)
Whalley, P. E. S., B.Sc. (1310), The Walnuts, Merrow, nr. Guildford, Surrey. (Orth., E., ornith., Z.)
Whicher, L. S., F.R.E.S., A.R.Ae.S. (1345), 6 Chisholm Rd., Richmond, Surrey. (C.)
White, E. J., M.P.S., F.B.O.A., F.S.M.C. (1748), High St., Westerham, Kent. (L.)
White, G. B. (1749*), 65 Virginia Rd., Thornton Heath, Surrey. (L.)
White, K. M. (715), Blackpool Corner, Crewkerne Rd., Axminster, Devon. (H., gen. ent., bionomics)
White, O. M. (140), 78 Eastdale Rd., Nottingham. (D.)
Whitehorn, K. P. (1084), 205 Hither Green Lane, London S.E.13. (L.)
Whitfield, L. L. (1805), 105c Station St., Birmingham 5. (L.)
Whitlock, R. N. (1900*), The Grove, Great Yeldham, Essex. (L.)
Whittington-Ince, R. (1929*), Meadow Cottage, Shorne, nr. Gravesend, Kent. (L., exot., Saturniidae)
Wickes, W. D. (1658), 19 Sunridge Ave., Luton, Beds. (L.)
Wiggin, A. J. (1428*), 172 Ingram Rd., Bloxwich, nr. Walsall, Staffs. (L.)
Wiggins, E. D. (975), Crawley Research Station, Brighton Rd., Crawley, Sussex. (C. esp. iridescent Phytophaga)
Wilkinson, W. (2037), Whinmoor, Highfield Ave., Goldthorpe, nr. Rotherham, Yorks. (C., econ. ent.)
Williams, Dr. C. B., M.A., Sc.D., F.R.E.S.‡, Entomology Dept., Rothamsted Experimental Station, Harpenden, Herts. (gen. ent., M., B.)
Williams, J. M. (1754*), 5 Gernant, Rhiwbina, Cardiff. (L.)
Willis, E. (2087), Whitmore Cottage, Carharrack, Redruth, Cornwall.
Willshee, C. J. (420), 63 Daventry Rd., Coventry. (L.)
Willson, Miss D. A. (1747*), 198 Church Road, Leyton E.10. (L.)
Wilson, E. A., M.A. (1777), 14 Willson Crescent, Ellesmere, Salop. (aq. ent.)
Wilson, I. O. (1479), Jessfield, Honiton Rd., Exeter, Devon. (C.)
Wilson, R. (1935*), 40 Battledean Rd., London, N.5.
Wiltshire, C. H. E. (2098), 1 Weymouth Ave., London, W.5. (C., horticultural pests)
Windsor, F. P. (785), Woodend, Horley, Surrey. (gen. ent.)
Wood, A. C. (1543), "Lauriston," Western Outway, Grimsby, Lincs. (L., H., C.)
Wood, Lt.-Col. A. E. B. (1675), Huntly, Bishopsteigton, Devon.
Wood, E. F. (684), 18 Nursery Road, Prestwich, Lancs.
Wood, R. W. L. (1765), Morven, Vale Rd., Hartford, Cheshire. (Bees, Silkmoths)
Woodcock, A. J. A. (1008), 65 Rock Ave., Gillingham, Kent. (C. esp. Adephaga)
Woof, W. R. (721), 9 Marshall St., Barnard Castle, Co. Durham. (B., NH., L.)
Worsfold, C. W. (2082), 3 Holt Hatch Cottages, Holt Hatch, nr. Alton, Hants. (L., Het., C., O., D.)
Woudstra, Miss E. M. (1948*), 35 Cecil Ave., Queens Park, Bournemouth, Hants. (R.)
Wright, A. E. (1666*), 53 Victoria Rd., Kensington, London W.8. (L.)
Wright, A. H. (355), 25 Markham Ave., Carcroft, Doncaster, Yorks. (L.)
Wright, J. (609), Lakota, Cranmore, nr. Yarmouth, I.O.W. (ornith., L., C.)
Wright, Capt. W. S., B.Sc., F.R.E.S., F.R.H.S., M.B.O.U., Mossvale, Aghalee, Lurgan, Co. Armagh, N. Ireland. (Irish L.)
Wrigley, G. F. (2061*), 39 Manchester Rd., Shaw, nr. Oldham, Lancs. (L.)
Wyers, N. (1241), "East View," Rayner St., Horbury, nr. Wakefield, Yorks. (L., ML.)
Wyre, D. (2093), 5 Campion Green, Leamington Spa, Warks. (L., C.)
Xicluna, George (1936), 36 Mgr. Farrugia St., Victoria, Gozo, Malta. (L., C.)
Zealey, A. (2088*), The Moorings, Druidstone Rd., St. Mellons, Mons.

GEOGRAPHICAL KEY

The purpose of this list is to enable you to get into touch with local members, if you are moving to a new district, or for excursions or holidays. Even members not interested in the same groups must have much of general entomological interest to exchange.

BRITISH ISLES

ABERDEENSHIRE. **Aberdeen:** Esslemont, Northern Naturalists' Club, Sangster, Shaw. **Torphins:** Miss Innes.

ANTRIM. **Belfast:** Skillen.

ARMACH. **Lurgan:** Wright.

AYRSHIRE. **Kilmarnock:** Percy.

BEDFORDSHIRE. **Ampthill:** Lovett. **Bedford:** Jeffreys, Narbeth. **Dunstable:** Barling, Pratt. **Leighton Buzzard:** Heley, Reid. **Luton:** Chandler, Hill, Wickes. **Woburn:** Palmer.

BERKSHIRE. **Abingdon:** Bingham. **Didcot:** Heard. **Hungerford:** Collier. **Maidenhead:** Ludlam, Page, Pook, **Newbury:** Saundby, Taylor, Turner. **Reading:** Dolton, Periera, Rudland. **Twyford:** Fidler. **Windsor:** Barnard. **Wokingham:** Wellington College Natural History Society.

BUCKINGHAMSHIRE. **Amersham:** Evans. **Aylesbury:** North, Spittles. **Haversham:** Richardson. **Marlow:** Ure. **Newport Pagnell:** Cripps.

CAITHNESS. **Wick:** Swanson.

CAMBRIDGESHIRE. **Cambridge:** Ford, Gardiner, Goodman, Harrison, Hunter, Storey. **Chatteris:** Clarke. **Fulburn:** Hartley.

CARMARTHENSHIRE. **Carmarthen:** Thomas.

CARNARVONSHIRE. **Pwllheli:** Jones.

CHESHIRE. **Altrincham:** Pervis. **Birkenhead:** Clarke, C. A., Clarke, M. D. A., Leonard, Prichard, Snell, **Chester:** Smith, S. G. **Crewe:** Green, J. **Frodsham:** Downing. **Hartford:** Wood. **Macclesfield:** Ashmore. **Nantwich:** Boyes. **Stalybridge:** Charlson. **Stockport:** Appleton, Thorpe. **Wilmslow:** Miss Podmore. **Wirral:** Green, C. D., Savidge.

CORK. **Bantry:** Graves.

CORNWALL. **Padstow:** Dexter. **Penzance:** Palmer. **Portleven:** Sargent. **Redruth:** Tremewan, Willis.

CUMBERLAND. **Scotby:** Bailey. **Whitehaven:** Read.

DERBYSHIRE. **Bakewell:** Dale. **Chesterfield:** Bilbie, Johnson, Miss Mitchell. **Dronfield:** Fearnhough. **Repton:** Bullock.

DEVONSHIRE. **Ashburton:** Kennard, Shobbrook, Stidston. **Axminster:** Bliss, White. **Barnstaple:** Hunt. **Bideford:** Midlen. **Bishopsteigton:** Wood. **Bovey Tracey:** Brock. **Budleigh Salterton:** Bradley. **Chagford:** Hollander. **Colyton:** Ashe. **Crediton:** Blackwell. **Exeter:** Jeremy, Morgan, Rowden, Turner, Wilson. **Exmouth:** Exmouth Training College. **Honiton:** Finlay. **Ilfracombe:** Emery, McCormick. **Newton Abbot:** Lees. **Okehampton:** Read. **Plymouth:** Hamlyn, Hanes, Miss Lucas. **South Brent:** Collier. **Tiverton:** Janes, Lyon. **Topsham:** Miss Ainsworth. **Torquay:** Wells. **Totnes:** Bennett, M. T., Bennett, N. C., Pitman.

DORSETSHIRE. **Cerne Abbas:** Pearson. **Dorchester:** Baker, Dalton, Lisney. **Poole:** Britton, Otter. **Portland:** Durston. **Swanage:** Ward. **Wareham:** Pemberton. **Weymouth:** Crocket, Row.

DUBLIN. **Glenageary:** Baynes.

DUMFRIES. **Dumfries:** Balfour-Browne, Cunningham. **Moffat:** Gents.

DURHAM. **Barnard Castle:** Moore, Robson, Wooff. **Chester-le-Street:** Dunn. **Darlington:** Moon. **Durham:** Todd. **Gateshead:** Harrison. **Houghton-le-Hole:** Hodgson. **Houghton-le-Spring:** The Field Club, Preston. **Sunderland:** Halstead, Jefferson, Morton, Suffield. **West Hartlepool:** Rowell.

ESSEX. **Barking:** Champion, Currie. **Braintree:** Hodges. **Brentwood:** Mills, Redwin, Smith, F. S. **Chelmsford:** Hurrell. **Clacton:** Austin. **Colchester:** Brown, P. C. **Dagenham:** McLaughlan, Peel. **Dovercourt:** Hart. **Felsted:** Sturdy. **Gidea Park:** Fordham. **Great Yeldham:** Whitlock. **Halstead:** Gaze, Moss, Putnam. **Ilford:** Grimwood, Hanlon, Ness. **Ingateson:** Bartrop. **Laindon:** Chapman. **Leigh-on-Sea:** Hilton, Searle, Weaving. **Loughton:** Dyce, Lockington, Sutton. **Maldon:** Hood. **Romford:** Gobbett. **Walton-on-the-Naze:** Seabrook. **Woodford:** Broughton, Chapman, Horsnell, Lorimer, Randall.

FIFE. **St Andrews:** Miss Jackson.

FLINT. **Caerwys:** Henstock, Hunking-Molyneux. **Rhuddlan:** Lewis. **Ruthin:** Vaughan-Roberts.

GLAMORGANSHIRE. **Bridgend:** Guile, Parson. **Caerphilly:** Bennett. **Cardiff:** Fidler, Pearce, Williams. **Merthyr Tidfil:** Evans.

GLOUCESTERSHIRE. **Bristol:** Bird, Caines, Carlton Park Secondary Modern Boys' School, Damsell, d'Assis-Fonseca, Miss Davis, Hobbs, Lewis, Millard, Packer, Southfield Boys' Insect Club. **Cheltenham:** Buck, Mulliner, Tayler. **Coleford:** Garraway. **Gloucester:** Dixon, Gay, George, Kemp, Thorpe. **Stroud:** Price, Richardson, Thom. **Stow-on-the-Wold:** Renfrew. **Tetbury:** Newton. **Tewkesbury:** Moore.

HAMPSHIRE. **Alton:** May, Robinson, Worsfold. **Andover:** James, Maxwell, Smith, E. K. **Basingstoke:** Tappenden. **Boscombe:** Sturt. **Bournemouth:** Bestwick, Broome, Dicker, Fraser, Mansfield, Riley, Scott, Turner, Ward, Miss Woudstra. **Brockenhurst:** Platts. **Eastleigh:** Curl, Holloway, Leonard. **Fareham:** Tribbeck. **Farnborough:** Fluck, Mason. **Farnham:** Michael. **Fordingbridge:** Burnard. **Liss:** Allen. **Lymington:** Farwell, Ham, Maggs. **Petersfield:** Miss Gibson, Slack. **Portsmouth:** Buckett, Heppell, Langford. **Ringwood:** Mackworth-Praed, Moody, Ponchaud. **Southampton:** Hosking, House, Mayne, Molyneaux, Parry, Redgrave, Smith, W. R., Tampion, Vardy, Watson. **Southsea:** Hunt. **Winchester:** Manson.

HEREFORDSHIRE. **Ross:** Knight, Lloyd.

HERTFORDSHIRE. **Barnet:** Dutton, Mead. **Berkhamsted:** Rollo. **Bishops Stortford:** Ashwell, Gripper, Hick, Pullen. **Broxbourne:** Parsons. **Harpenden:** Jarvis, Phillips, Taylor, Williams. **Hatfield:** Stokes. **Radlett:** Pringle. **Rickmansworth:** Lydgate-Bell. **St Albans:** Miss Burrage. **Stevenage:** Pilcher. **Tring:** Cockayne. **Ware:** Gerard, Graham, Steel. **Watford:** Clark, Fox, Knight, Penrose, Taylor, Tonge.

HUNTINGDONSHIRE. **Huntingdon:** Leeds.

INVERNESS. **Aviemore:** Harwood. **Newtonmore:** Harper, G. W., Harper, M. W.

ISLE OF MAN. **Castletown:** Nelson.

ISLE OF WIGHT. **Yarmouth:** Blair, Wright. **Wroxhall:** Lobb.

KENT. **Ashford:** Duffield, Rayner. **Beckenham:** Farage, Freeman, Gully, Lane. **Bexley:** Heselden, Newman. **Biddenden:** Farley. **Birchington:** Watkins. **Bromley:** Miss Andrews, Gowing-Scopes, Lawrence, Little, J. C., Siggs, Swain, A. M., Swain, F. A., Watts. **Canterbury:** Ferneley, Wacher. **Chatham:** Cameron, Fordham, Greenwood, Major, Parker, South, Tesch, Woodcock. **Cranbrook:** Boxall, Bull. **Dartford:** Honeybourne, Rivers, Scudder. **Faversham:** Featherstone. **Goudhurst:** Hodge. **Gravesend:** Read, Southwood, Whittington-Ince. **Hawkhurst:** Chatfield. **Longfield:** Miss Read. **Maidstone:** Beaufoy, Earl, Grant, Henshaw, Homewood, Usher. **Ramsgate:** Lanfear. **Sandwich:** Harle. **Sevenoaks:** Walshe. **Sheppey:** Miss Levy, Page. **Sidcup:** Bidwell, Goodwin, Ling. **Sittingbourne:** Goddard. **Waltham:** Hunt. **Westerham:** Bennett, Brunsden, Edwards, White.

LANARKSHIRE. **Glasgow:** Miss Craig, Hill, Lothian, Pennock, Templeton. **Forth:** Ritchie.

LANCASHIRE. **Ashton:** Lomas. **Blackburn:** Bryce. **Blackpool:** Howard, Webster. **Bolton:** Coxey, Horton-Omerod. **Bury:** Bailey. **Dalton-in-Furness:** Allan. **Fleetwood:** Wallace. **Grange-over-Sands:** Berry. **Lancaster:** Harrison. **Leigh:** Orrell. **Liverpool:** Curd, Davidson, Miss Gough, O'Rourke. **Manchester:** Boardman, Hardman, Michaelis, Nathan, Warwick. **Morecombe:** Short, Ward. **Oldham:** Barbrook, Lees, Mills, Skidmore, Wrigley. **Prestwich:** Wood. **Rochdale:** Hardman. **St Annes-on-Sea:** Watson. **Southport:** Taylor. **Warrington:** Jeavons, Morris, Ritson.

LEICESTERSHIRE. **Kirkby Muxloe:** Parker. **Leicester:** Crammer, Hanson, Tailby, Tozer. **Loughborough:** Henderson, Walker, D., Walker, P. A. **Market Harborough:** Buckler, Harris-Evans. **Melton Mowbray:** Ottewell, Robertson.

LINCOLNSHIRE. **Boston:** Cooper, Mrs Cooper. **Grantham:** Chambers. **Grimsby:** Miss Hopkins, Jeffs, Wood, A. C. **Prestwick:** Wood, E. F. **Sleaford:** Haywood, Storer. **Spalding:** Cullum, Stamford, Taylor.

LONDON. **E.4:** Brown, R. C., Keyes, Roper, Shaw. **E.7:** Baxter, L. N., Baxter, R. **E.8:** Stephenson. **E.10:** Miss Willson. **E.11:** Syms. **E.15:** Pratt. **E.17:** Ison, Smith, R. A. **E.C.3:** Colman, Welti. **N.3:** Reynolds. **N.5:** Wilson. **N.12:** Cross. **N.14:** A'Brook. **N.16:** Nestel. **N.17:** Ogden. **N.18:** Janes. **N.20:** Carr, Lorimer. **N.21:** Vanden Driessche, Vince. **N.22:** Colyer. **N.W.1:** Lord Malahide. **N.W.2:** Cox. **N.W.3:** Braithwaite, Harrison-Gray. **N.W.4:** Webb. **N.W.6:** Hawdon, Hillaby. **N.W.8:** Bushby, Leston. **N.W.10:** Mrs. Cooper, Gilder. **S.E.2.:** Showler. **S.E.3:** Hyatt, Taylor. **S.E.5:** Bradley, Wakeley, Weller. **S.E.9:** Miss Cove, Golding, Parker. **S.E.10:** Mrs Griffin. **S.E.11:** Quainton. **S.E.12:** Bobe,

Bruce, Fox, Pople. **S.E.13:** Whitehorn. **S.E.18:** Hards. **S.E.19:** Spearman. **S.E.21:** Walton. **S.E.23:** Shaw. **S.E.25:** Cornelius, Lewis. **S.E.26:** Ewart, Lamb. **S.W.1:** Collier, Clayton, The Nature Conservancy. **S.W.2:** Edwards, Mounter, Sinclair. **S.W.6:** Roberts, Stammers. **S.W.7:** Britton, Collins, Howarth, Tams. **S.W.8:** Notre Dame High School. **S.W.9:** Ollevant. **S.W.15:** Swain. **S.W.16:** Mrs Blake, Blake, T. G., Spink, Vigay, Warren. **S.W.17:** Miss Allen. **S.W.18:** Sutton. **S.W.19:** Cartwright, Leppard, Thomson. **S.W.20:** Nott. **W.1:** Shapland, Lord Talbot. **W.3:** Mitchell. **W.4:** Craig. **W.5:** Brown, Hanson, S. M., Locke, Wiltshire. **W.6:** Uffen. **W.8:** Brangham, Miss Longfield, Wright. **W.9:** Jones, A. W. **W.10:** Makings, Watson. **W.11:** Crotch. **W.12:** Ventom. **W.14:** Cameron, Hamill, Messenger, Rogers. **W.C.1:** Harding, Millar.

MIDDLESEX. **Bedfont:** Kindered. **Brentford:** Ranger. **Ealing:** Stroud, Ward, Waterman. **Enfield:** Eagles, **Feltham:** Classey. **Harrow:** Byerley, Hendy, Green, J. G., Martin, Petty, Port, Taylor, Walker. **Hayes:** Moppett. **Pinner:** Denman, Gilbert, Harris. **Potters Bar:** Hague, Odell. **Ruislip:** Atkinskon, F. D., Blackburn, Gilvary, Robertson, Stutt. **Stanmore:** Hatcher, Hilliard, McCrae. **Sunbury-on-Thames:** Ogden. **Twickenham:** Stallwood. **Wembley:** Porter. **West Drayton:** Ayres, Taylor.

MERIONETH. **Blaenau Festiniog:** Griffiths.

MIDLOTHIAN. **Edinburgh:** Beattie, Ewing, Finlay, Manson, Morrison, Pelham-Clinton, Prior.

MONMOUTHSHIRE. **Llahilleth:** Jenkins. **Newport:** Keen. **St. Mellons:** Zealey.

NORFOLK. **Dereham:** Durrant. **King's Lynn:** Day, Swann. **Norwich:** Addison, Evans, Manning, Riley, Ruthven. **Stoke Ferry:** Fenn.

NORTHAMPTONSHIRE. **Kettering:** Morgan, Robinson. **Kingsthorpe:** Rawlinson. **Northampton:** Fisher, Walding. **Peterborough:** Booker, Russell, Tebbs, Turner. **Towcester:** Humphrey. **Wellingborough:** Gent, Payne.

NORTHUMBERLAND. **Alnwick:** Thorp, Tully. **Morpeth:** Halkier. **Newcastle-on-Tyne:** Benson, Burtt, Daley, Owen, Rutherford Grammar School (Boys). **Ponteland:** Barker. **Seahouses:** Ennion.

NOTTINGHAMSHIRE. **Nottingham:** Adams, Hodson, White. **Retford:** Ranby House School. **West Bridgford:** Mills. **Whitwell:** Walker, **Worksop:** Brown, R. M.

OXFORDSHIRE. **Banbury:** Berkeley, Gibbs. **Blandon:** Hammond. **Kidlington:** Hedderly. **Oxford:** Barrett, Blackwell, Carpenter, Cooke, Emmet, The Hope Professor, Kettlewell, Martin, Pontin, St Edward's School, Sheppard.

PEMBROKESHIRE. **Haverfordwest:** Conder, Dale Fortfield Centre, Thomas.

RADNORSHIRE. **Llandrindod Wells:** Miss Payne.

RENFREWSHIRE. **Greenock:** Angus, Maclaurin. **Paisley:** McNally, Ramsay.

ROXBURGH. **Hawick:** Pow.

RUTLAND. **Oakham:** Grundy. **Uppingham:** Lofting.

SHETLAND ISLES. **Lerwick:** de Mercado.

SHROPSHIRE. **Church Stretton:** Nisbet. **Ellesmere:** Wilson. **Shrewsbury:** Miss Edwards, Lloyd, Smith, J. S., Tanner.

SOMERSETSHIRE. **Axbridge:** Hanson. **Bath:** Bell, Row, Weeks. **Bridgwater:** Bing, Cowley. **Cheddar:** Walker. **Crewkerne:** Keylock. **Frome:** Cruttwell, Scott, West. **Langport:** Pegg. **South Petherton:** Keetch. **Taunton:** Neal. **Wellington:** Archer. **Weston-super-Mare:** Ball, Blathwayt, Clarke, Downing, Poole.

STAFFORDSHIRE. **Burton-on-Trent:** Clarke, Crowther, Jarman, Tanton. **Kingswinford:** Pearson. **Leek:** Miss Johnson. **Oldhill:** Mason. **Stafford:** The County Training College, Page, Rooker, Sandy. **Stocktonbrook:** Washington. **Walsall:** Wiggin. **Wolverhampton:** Kearn, Long, Morris, Smith, K. G. V.

STIRLING. **Grangemouth:** Mabbott. **Falkirk:** Hutchison.

SUFFOLK. **Bury St Edmunds:** Eley, Ransom, Rogerson, Shield. **Ipswich:** Beaufoy, Horsley. **Lowestoft:** Burton, Roe. **Stowmarket:** Chipperfield. **Woodbridge:** Garrett-Jones.

SURREY. **Ashtead:** Greenhill. **Camberley:** Knight. **Carshalton:** Booker, Groves, Rossner. **Caterham:** Alderton. **Chertsey:** Parsons. **Cranleigh:** Hurst, Newman, Russell, Weller. **Croydon:** Barnett, Burrows, Collins, Field, Miles, Parmenter, Twyford, White. **Dorking:** Haynes, Juniper Hall, Kerrich. **Epsom:** Horton, James. **Esher:** Perrins. **Ewell:** Goddard, Thorton. **Farnham:** Hodgkinson. **Guildford:** Barton, Dolley, Holroyd, Pearson, Whalley. **Horley:** Windsor. **Kingston:** Owston, Redgrove, Walton. **Merstham:** Wall.

Mitcham: Prevett. **Richmond:** Whicher. **Surbiton:** Austin, Burton, Durrant, Le Masurier, Pickering, Raybould, Simpson-Scott, Tailby. **Sutton:** Currie, Darling, Davies, Gates, Hyde-Wyatt, Last, Parrett, F. I., Parrett, M., Rumsey, Struthers. **Wallington:** Christie, Owers, Rothchild. **Walton:** Dale, C. A. P. **Weybridge:** Best, Dale, J. A. **Woking:** de Worms, Hellings.

SUSSEX. **Angmering:** Higgins. **Bexhill:** de Whalley. **Brighton:** Banner, Durham, Dyson, Eade, Goodbody, Parker, Pickett, Walder. **Crawley:** Miss Gathergood, Wiggins. **Eastbourne:** Revell, Smith, D. S. **East Grinstead:** Morton. **Felpham:** Cartwright. **Ferring:** Edwards. **Hassocks:** Cribb. **Hastings:** Chitty, Dannreuther, Roberts. **Haywards Heath:** Brunswick School Nat. Hist. Soc., Edelsten, Floyd, Levett, Stuart. **Heathfield:** Crisp, Hitchens. **Horsham:** Blake. **Lewes:** Miss Brown. **Newhaven:** Bickerstaff. **Worthing:** Menzies.

TIPPERARY. **Clonmel:** Murray.

WARWICKSHIRE. **Birmingham:** Bridgen, Dixon, Ensor, Golby, Hammond, King's Norton School, Manly, Markham, Myatt, Scott, Sladen, Smith, P. S., Wadsworth, Wager, Whitfield. **Coventry:** Crawforth, Raven, Smith, K. J., Smith, S. F., Wilshee. **Leamington:** Wyre. **Rugby:** Cave, Claridge, Daltry, Davis, Kennard, Nevile, Smith, T. H. W. **Stratford-on-Avon:** Floyd. **Sutton Coldfield:** Smith, D. J. **Tysoe:** Tysoe Church School. **Warwick:** Warwick County Museum.

WESTMORLAND. **Kirkby Lonsdale:** Hall.

WILTSHIRE. **Bradford-on-Avon:** Smith, J. A. J. **Calne:** Ewing. **Corsham:** Desmares. **Ramsbury:** Fraser. **Salisbury:** Menneer, Thompson. **Tilshead:** Campbell. **Trowbridge:** Bartlett, Weddell.

WORCESTERSHIRE. **Worcester:** Blake.

YORKSHIRE. **Barnsley:** Atkinson, Lees. **Boroughbridge:** Rae. **Bradford:** Benson, Binks, Briggs, Haxby, Hewson, Marson, Mitchell, Petty, Poole, Smith, A. E. **Catterick:** Leonard. **Dewsbury:** Buckley, Grace. **Doncaster:** Hyde, Smith, E. W., Waddington, Walter, Wright. **Guisborough:** Calvert, Harwood, Horner, Newson. **Halifax:** Collinson, Schofield. **Harrogate:** Jesper. **Huddersfield:** Waugh. **Hull:** Bilton, Clarkson, Duncan, Jones, E., Kenington, Rogerson, Wade. **Ilkley:** Miss Bartle. **Kirk Ella:** Dibb. **Knaresborough:** Beck. **Leeds:** Anderson, Barham, Coldcotes Beetle Club, Firth, Kennedy, La Touche, Miss Morton, Ramsden, Scott, Simmonds, Taylor, Thornton. **Mexborough:** Seago. **Middlesbrough:** Allen. **Rotherham:** Cooke, Wilkinson. **Scarborough:** Ellison, Walsh. **Sedbergh:** Rayner. **Selby:** Jackson. **Settle:** Malham Tarn Field Centre. **Sheffield:** Burton, Ford, Marsden, Smith, M., Tyssen. **Wakefield:** Hebden, Wyers. **Withernsea:** Harding, Lewis. **York:** Bootham School Nat. His. Club, Drummond.

OVERSEAS

AUSTRALIA. **N.S.W., Sydney:** Australian Branch A.E.S. **W.A., Freemantle:** Baker.

BELGIUM. **Brussels:** Vieujant. **Liége:** Le Clercq.

BRITISH CAMEROONS. **Mamfe:** Miss Ika.

CANADA. **Ontario:** Rogerson. **Saskatchewan:** Shaw.

CENTRAL AFRICA. **Nyasaland:** Gray.

FRANCE. **Nord, Lille:** Millon. **Paris:** Roudier.

GERMANY. **Hannover:** Hesselbath.

HAWAII. **Honolulu:** Krauss.

INDIA. **Upper Assam:** Norman.

JORDAN. Trought.

KENYA COLONY. **Nairobi:** Bell. **Nakuru:** Townsend.

MALTA. **B'Kara:** Valletta. **Gozo, Victoria:** Xicluna.

NEW ZEALAND. **Wellington:** Gibbs.

PAPUA. **Port Moresby:** Slatter.

S. AFRICA. **Cape Town:** Duke, Holmes. **Johannesburg:** Capener. **Natal:** Newton, Pickard-Cambridge. **Zululand:** Miss Deacon.

S. RHODESIA. **Lalapanzi:** Cornes.

UGANDA. **Kampala:** Trought, T. E. T.

U.S.A. **California:** Karp, Sperry. **Georgia:** Isbill. **Illinois:** Irwin. **Michigan:** Mrs Hynes. **New York:** American Museum of Nat. Hist., Keji. **Ohio:** Ferguson. **Washington D.C.:** Boettcher. **Wisconsin:** Koeber.

WEST AFRICA. **Calabar:** Christ Church School.

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Return Postage—The only requirement of members for the use of the Advisory Panel is that they must enclose stamps to cover cost of return of specimens, or stamped envelope for reply. Otherwise, reply cannot be guaranteed. It will also be of assistance if the membership number of each enquirer is quoted in all enquiries. Unless otherwise stated, advice is only given on the fauna of the British Isles. Enquirers must remember that Advisers are busy people: dead material should be sent during the winter months when evenings are less likely to be occupied with collecting or mounting their own captures. Where large numbers of specimens are to be named, the enquirer should preferably have this done at a Museum, where paid officials are employed to deal with such enquiries. A personal visit, moreover, will usually solicit more information than would be obtained by correspondence.

Labelling—Details of locality, foodplant, date, time and mode of capture and many other details are often essential to identification. All specimens should be labelled with such data, preferably placed on a small card on the same pin as the insect. In all cases details of locality will be treated as confidential.

New Advisers—There are still many subjects not yet covered by the Panel, and volunteers to assist in these departments are much desired. Offers should be sent to E. Lewis, 8 Parry Road, London, S.E.25.

Lepidoptera (Butterflies and Moths)

Identification of Macro larvae—Hammond, H. E. (423).
Varieties of Rhopalocera—Russell, S. G. Castle (119).
Rearing Silkmoths—Crotch, W. J. B. (1181).
Hybrid Lepidoptera—Heslop-Harrison, J. W. (716).
Distribution and local lists, Macros and Micros—Lisney, Dr. A. A. (315).

Coleoptera (Beetles)

Books and collecting methods—Walsh, G. B. (24).
Identification, other than the groups named below—Tozer, D. (36).
Elateridae, identification and advice—Cooper, B.A. (‡).
Haliplidae and Pselaphidae, identification and advice—Pearce, Rev. E. J. (796).
Waterbeetles, identification and advice—Balfour-Browne, Prof. F. (340).

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Conopidae, identification—Smith, K. G. V. (897).
Larvaevoridae and Muscidae, identification—d'Assis-Fonseca, E. C. M. (2079).

Odonata (Dragonflies)

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Identification and advice—Syms, E. E. (406).

Hemiptera-Heteroptera (Het-bugs)

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Identification—Simmonds, P. S. (2009).

Insect Galls

Identification and advice—Manning, S. A. (1774).

Arachnida (Spiders)

Identification and advice—La Touche, Dr. A. A. D. (884).

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General advice—Syms, E. E. (406).

Microscopy

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Photography
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Cinematography — GOLDING, D. P. (904).

Botany
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Selection, propagation and cultivation of foodplants and floral attractions—DYSON, R. C. (91).

Pests
Farm and garden pests—COOPER, B.A. (‡).
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Flora and Insect Fauna of Hebrides —HESLOP-HARRISON, J. W. (716).

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Cockroaches—JOHNSON, J. H. (1840).

Diapause—HOPKINS, Miss B. A. (827).

Distribution of certain Lycaenidae (Blues)— DYSON, R. C. (91).

Distribution of Elephant Hawk—JOHNSON, J. H. (1840).

Ecology of Ponds—LESTON, D. (1589).

Insect Galls—MANNING, STANLEY A. (1774).

Larval Colours—TAYLOR, PETER G. (719).

Microscopy—ISON, C. H. (1343).

Orthoptera (habits and distribution) —MICHAEL, P. (748).

Silkmoths—SMITH, W. R. (1641).

Time of emergence from pupae—BRADLEY, P. (1360).

Weevils—PEARSON, A. E. C. (1667).

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Kipling poem.

Has it yellower sands?

Part of a web.

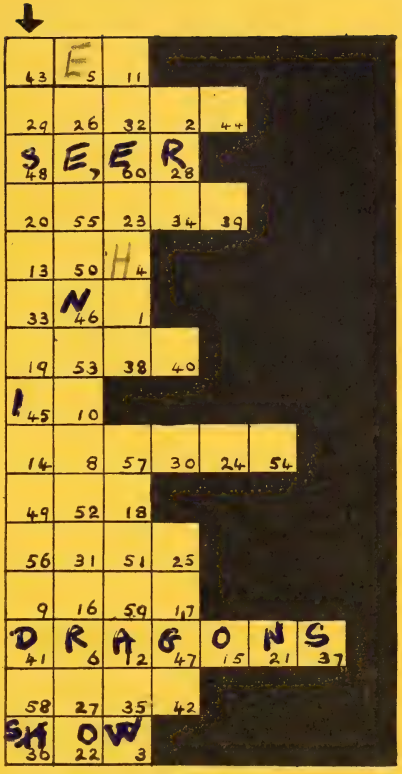
Try carapace.

About 25mm.

St George's flies?

Fate is no navy.

Porcine female.



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Enter the solutions opposite the clues. The initial letters below the arrow make a subject of interest. Transfer the letters to the square below as shown by the numbers and you will find a message. Write the "subject" and "message" on paper, with your name and address, and enclose four $1\frac{1}{2}$d stamps in an envelope addressed to the Crossword Editor, 5 Stanley Crescent, Kensington, London, W.11, *before 15th July.*

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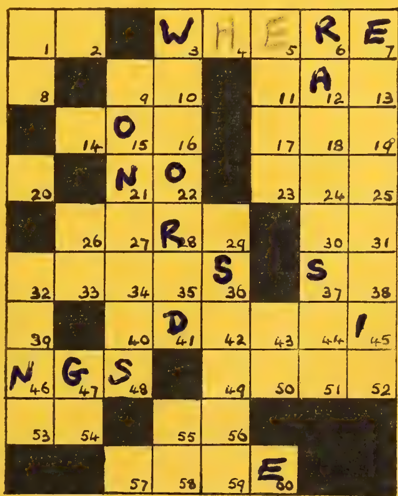

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THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES NOTICE

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AES BULLETIN No. 140 AUGUST 1952

THE SCIENTIFIC APPROACH

I should like to make a few comments on the views about the scientific approach expressed by Mr. I. S. Menzies (585), and quoted by the Editor on page 25. Mr. Menzies agrees with the suggestion of Mr. Taylor in a previous letter that the scientific approach involves the correlation of observed facts and the formation of theories, and then goes on to ask " . . . but is not its ultimate aim to reveal the cause and workings of life in material terms?"

It seems to me very important to realise that scientific method can hardly be said to have any " ultimate aim " whatever. Aims are no doubt formulated by scientists, but these are concerned with the results of scientific activities and are not necessarily related to scientific method. This method, far from supplying any ultimate aims, is a system whereby scientists examine as objectively as possible all experience, and tentatively draw whatever conclusions this experience seems to suggest. Certainly many scientists have come to suspect that " the cause and workings of life " can be explained " in material terms," but should evidence arise which points in some other direction, scientific method is as relevant as ever. Science is interested in all experience.

Mr. Menzies continues: " It follows that only the more material and precise observations (crude facts) are acceptable." Why this implied dislike of " crude facts "? In what way do these differ from any other facts? Mr. Menzies seems unaware that the imagination of the scientist may play an important part in the acquisition of new knowledge. Many a striking discovery has been the result of a hunch. The hunch, however, is subject to scientific method and loses none of its excitement in the process. Scientists do not wish to announce the results of their inspiration as a contribution to science before they have tested them in the light of what is already known.

My main concern is to show that Mr. Menzies is mistaken in drawing a distinction between the scientists with their " precise facts," and the amateurs interested in " that side of their hobby which is not so strictly material." If there are " more things in Heaven and earth than are dreamed of in your (' scientific ') philosophy," any scientist would be most interested to examine the evidence.

After all, the only alternative to being scientific is to be unscientific, and surely no honest investigator wishes to be so classed. I am a little suspicious that this is where the ideas of Mr. Menzies would lead us. " If," he says, " as it appears ' Science ' is the ' Parade ' these days, it is surely desirable to have an amateur society which will allow one occasionally to be ' off parade '." Now there is surely only one science, and that has no inverted commas. Anything else is likely to be unscientific, and involve the neglect or denial of experience in the interests of preconceived ideas or desires. " . . . the last laugh may be with those who . . . *like* (my italics) trying to find these things (in Heaven and earth) reflected in nature just as the great naturalists of previous generations did." The great naturalists of previous generations had some excuse for being in a measure unscientific, as scientific method was less developed. In fact, I do not wish to do the old naturalists an injustice. In their day they broke new ground, and should be more appropriately mentioned in connection with the pursuit of science, as, indeed, we find in the note inserted in the volumes of " The New Naturalist " series. Part of this note is worth quoting: " The aim of this series is to interest the general reader in the wild life of Britain by recapturing the inquiring spirit of the old naturalists. The Editors believe that the natural pride of the British public in the native fauna and flora, to which must be added concern for their conservation, is best fostered by maintaining a high standard of accuracy combined with clarity of exposition in presenting the results of modern scientific research."

Yes, I think that the fascination of discovery lies inside science and not outside it, and I would urge all young AES members not to be put off by

the discipline of " science," and misled by the alleged charm of being " off parade."

Arthur A. Moppett (1841).

FRITILLARY STUDY

R. Ludlam (1519*) is studying the distribution of the Small Pearl Bordered Fritillary (*Argynnis selene*) and the Pearl Bordered Fritillary (*A. euphrosyne*) in the area embracing those parts of Buckinghamshire and Berkshire within a 10-mile radius of Slough. He would be grateful if all members who have noticed these butterflies in this area would send him information as to their distribution and numbers where they occur.

BUMBLE BEES (6)

(Continued from page 47)

BOMBUS PRATORUM Linn.
(Early Nesting Bumble Bee).

Size small.

Distribution
Common throughout England, Wales and Scotland.

Descriptions

Queen
Head black.
Thorax black, with an anterior yellow band.
Abdominal segments
1. black.
2. yellow, black in dark specimens.
3. black.
4. black (may be red).
5, 6. red.

Worker
Colouring resembles Queen, but size smaller.

Male
Head face and top of head yellow.
Thorax black with anterior yellow band, posterior yellow band also present in light specimens.
Abdominal segments
Dark specimens
1 to 4. black.
5 to 7. red.
Light specimens
1, 2. yellow.
3. black.
4. red or black.
5 to 7. red.
Note: There are numerous intermediate forms between the two extremes.

BOMBUS PRATORUM. LINN.

BOMBUS JONELLUS. KIRBY

BOMBUS JONELLUS Kirby.
(Heath Bumble Bee).

Size medium to small.

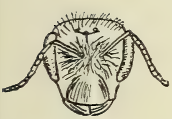
Distribution
A local species frequenting heaths.

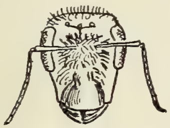
Descriptions

Queen
Head black with yellow on top.
Thorax black with yellow anterior and posterior bands.
Abdominal segments
1. yellow.
2. black with yellow anterior edge.
4 to 6. white.

Worker
Colouring as Queen, size smaller.

Male
Colouring resembles Queen but face is yellow and the black on the abdomen often reaches the anterior portion of segment 4.
Note: The colouring of this species resembles that of *B. hortorum* from which it may be distinguished by its short face (see figure) and often by the presence of red hairs on the corbicula.


Bombus jonellus. Kirby


Bombus hortorum. Linn

BOMBUS LAPPONICUS Fabr.
(Mountain Bumble Bee).

Size medium.

Distribution
Local, confined to hilly or mountainous country.

Descriptions

Queen
Head black or yellow.
Thorax black with a yellow band in front and one behind, which is absent in dark specimens.
Abdominal segments

Dark specimens
1. black.
2. black to red.
3 to 6. red.

Light specimens
1. yellow.
2 to 6. red.

Worker
Colouring similar to Queen, but smaller.

Male
Coloured like the Queen.
(*To be continued*).

T. B. Poole (1681).

BOMBUS LAPPONICUS. FABR.

'WARE WOOLLIES!

Mr. W. H. Rowe Jeremy (1778) reports a case of painful damage to a boy's eye caused by the hairs of a Woolly Bear caterpillar (probably *Arctia caja*) which was lightly flicked into it. When the eye was examined by the slit-lamp microscope, seven hairs were seen to be embedded in the deep layers of the cornea. Only two could be extracted; the others migrated backward into the iris, causing an intense inflammation. The worst effects were alleviated by treatment, but it is possible that the sight will never be quite so good as before.

This particular accident is, we hope, not likely to happen to any of our members. But many of us will be handling hairy caterpillars this summer and it is easy to rub an eye un-

thinkingly; so take care and beware of any loose hairs that may get on your hands.

STORY OF A PSYCHID

The Psychidae are moths whose larvae build movable houses made of bits of stick, thorns, scraps of grass or other materials, and spend the greater part of their larval lives improving, enlarging, and dragging these houses about in search of food. The females of many species are wingless; others are even legless. These never emerge from their houses or "cases," but wait inside for a husband, lay their enormous number of eggs inside the case, and die. Some species are definitely known to be parthenogenetic.

Early in January 1948 one of these cases, made of twigs from a "Leleshwa" bush (*Tarchonanthus camphoratus*) was brought in, lay on my table for a few days, and then, since there had been no sign of life, was put into an open glass jar on the windowsill, and forgotten. On March 28th, my table was covered with a very large number of tiny, black, very active creatures, running rapidly about, their abdomens cocked up vertically, so that they seemed to be walking on their heads. (Fig. 1 shows a much enlarged sketch of one.) I had no idea what they were; and since they were scraping patches on book-covers, and chewing the edges of some sheets of cork, I hastily (and most regrettably) sprayed the lot with insecticide. Later, I began to wonder, "Could they possibly have come from that old Psychid-case?"

They had. I slit the case open, and found a few still alive inside the pupa-shell from which their mother had emerged. But all these died except one, after a few days.

Immediately on hatching, the young larvae had spun a thick, close web of white silk over the empty case, and over the inside of the jar. I know now, from further experience, that this web is normally spun over twigs, etc., near the case, and that the baby larvae are protected by it while they make their own first little cases.

Inside the old case I found, in order from top to bottom, the cast skin of the female larva; her pupa-shell, head downwards; inside the shell, but with her anal end protruding outside it, at the head end of the case, the dead female moth; a mass of yellow fluff, completely blocking up what was, in her larval life, the anal orifice of the case. (Presumably the ova were laid in this fluff, and the young larvae had made their way out through it.)

I provided the few young larvae with blossoms, bark, and leaves both green and withered, from a Leleshwa bush; and they proceeded eagerly, and apparently without thought of feeding, to make their first covering. This was a flexible sack, in shape a very wide short cone, open at the base, where the larva's head, thorax and nearly half its abdomen protruded from it. The larva ran about with this cone sticking up in the air—a most comical little object. (Fig. 2.) The point of the cone was white, made of bits of blossoms, and then came a ring of chewed bark.

Unhappily, all but one of the larvae died. The following extracts are from a "diary" of the survivor, which I kept almost daily throughout its life.

April 18. Still eats only withered leaves.

April 24. Quiescent—perhaps moulting.

May 9. Began to eat the "down" from the surface of green leaves.

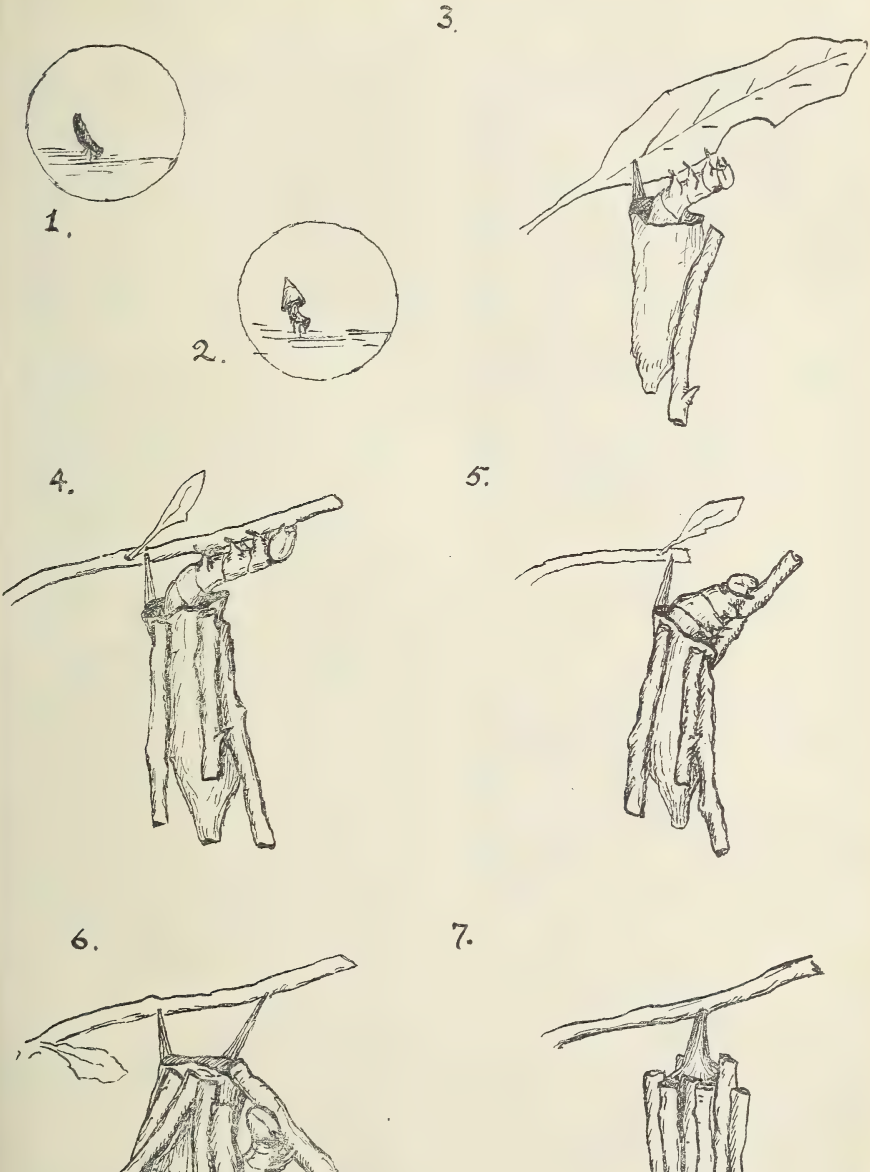
June 9. While he feeds, the sack is now sometimes, but not always, anchored to a twig or leaf by a number of threads, attached to one point of the sack-rim. He sometimes stretches himself out of the sack for half his length to reach the food. His legs are very long, and mandibles very large for so small a larva.

July 11. To-day he attached the first stick to his sack, but I missed seeing the operation. (Fig. 3.)

July 17. Attached a second stick.

Aug. 2-5. Sack now nearly 1″ long, with 3 sticks attached.

Aug. 13. At last I have seen the process of stick-cutting and fixing. At 2 p.m. I found him walking up and down a sloping bit of twig, for about $1\frac{1}{4}$″ from its free end. He was quite clearly pacing out an appropriate length. At the end of his "beat" was a small leaf, near to which at last he anchored his sack. He then leant sideways out of the sack, and began to gnaw off buds and excrescences on his chosen length of the twig. (Fig. 4.) Then he cut the piece off, gnawing round and round it, close to the point of anchorage. This cutting process took 7 minutes. When the twig came adrift, holding it in his legs, he "planed" it from end to end with his jaws, turning it round and round, and end-for-end,



(1) New-born larva of *Clania* sp. (×3). (2) Larva with first case (×2). (3) First stick attached to sack. Larva feeding. (4) Trimming up a stick before cutting it off. (5) Cut-off stick being planed before attachment to sack. (6) Stick, fixed to sack at its upper end, is being hooked and pulled in. Larva is protruding through hole in side of sack. *Two* anchors are used during this part of work. (7) Finally tied up for pupation. Permanent anchor greatly strengthened. Actual length from top of longest stick to point of cone just under 2″.

with complete confidence and mastery. It was an amazingly "human" process to watch: particularly, perhaps, for those of us who have seen an Indian carpenter doing much the same thing with bare feet and an adze. (Fig. 5.) At last he fastened one end of the stick to the top edge of the sack, cut his anchor strings, walked along the twig, and began the same processes—measuring, trimming, cutting, planing, and glueing in place another length of twig; the sack being, of course, anchored again further up the branch on which he was working. By 6.10 he had cut and fixed enough twigs to fill the circle of the sack-rim: but they were all attached at the top ends only, and stuck out at all sorts of angles from the sack. At 6.15 he was closing up the sack-mouth by draw-threads just inside it, no doubt for a well-earned rest.

August 14. This morning I found that he had TWO anchors, at opposite sides of the sack rim. This is the first time I have seen this extra precaution.

August 15. It is now quite clear why he fixed the extra anchor yesterday. The sack is swinging about violently, with great convulsions going on inside. His head has just appeared through a hole he has made in the side of the sack, about half-way down. He stretched out of this hole until he could reach one of the sticks (which are fastened only at the top end), and seize it in his legs. Then he withdrew, pulling the stick after him against the side of the sack. (Fig. 6.) He then glued it in place, and when this was done, came out again through a fresh hole to hook, draw in, and fix the adjoining stick. This, like most of the others, required a bit of trimming up before it would fit snugly. By noon, all the sticks had been drawn up against the sack, and fixed roughly parallel to one another. They were rather widely spaced, so that the rags of the sack, which he had almost destroyed by making all those holes in it, were visible between them. During the afternoon he was working furiously, and could be seen through these spaces going round and round, upside down. He was detaching the cone-shaped lower end of the sack, and fixing it in a new position further down than its previous position.

August 16. He is now clearly making a new silk lining for the whole case.

August 17. The case seems to be finished for the present. It is nearly $1\frac{1}{2}''$ long, and the lower ends of the sticks have been drawn closely together, so that the case is smaller in diameter at the lower end than at the upper. The cone projects slightly at the lower end, and at the top there is a good length of the flexible sack, garnished with scraps of bark.

August 20. He feeds regularly, with long intervals between meals. From time to time, a pellet of frass is extruded from the cone.

September 20. Very active and restless, but not eating. It is amusing to watch his progress. He stretches out, takes firm hold of a leaf in his jaws, and hunches himself forwards—case and all, of course—until the third pair of feet can get a new hold near his mouth. Then he stretches out and repeats the process. The whole thing reminds one of a parrot travelling round his cage by the aid of beak and claws. His strength must be enormous: for the case is heavy, and a most awkward thing to get through narrow spaces. But by twisting and shrugging, or by backing and hauling again, he can get the thing through the most difficult places.

September 21. Still restless, I gave him fresh bits of twig, bark, and some flower-heads. These were what he wanted. He has spent most of the day eating the covering of unopened buds, pulling a bud well down into the sack-mouth, and so eating almost under cover. He has also lengthened the sack-mouth, and stuck little bits of the blossoms all over it.

October 5. Has cut and fixed two sticks, the top ends of which project nearly $\frac{3}{8}''$ upwards beyond the tops of the old sticks. They have been fitted in gaps made by removing two of the old ones, which are lying at the bottom of the jar.

October 28. Anchored with TWO bunches of threads again! What is up now? Pupation?

November 27. Some time since my last note he has added many more threads, and now the sack-mouth is completely closed, and threads from all round it are attached to the twig. They appear to be all stuck together: so I conclude that this is the final tie-up for pupation.

December 20. Nothing to report: he must have pupated. (Fig. 7.)

February 3, 1949. To-day I found a dead female moth at the bottom of the jar. She must have emerged from the pupa some time ago, and lost patience waiting for a husband to appear; for by all the rules she should not have come out at all. She (for she must be given her correct gender now) belongs to Genus *Clania*, and is probably *modermanni.* If only I had known that she had emerged and was waiting inside her case, I might have got a further generation, for some males of the same species have lately emerged in another cage.

A. L. H. TOWNSEND (1691).

[*Mr. Townsend writes from Kenya, but there are ten species of smaller* Psychidae *to be found in the U.K. The commonest,* Pachythelia villosella *Ochsenheimer, is figured with its larval case in Kirby's "Butterflies and Moths", 1913, as* Acanthopsyche. *It is a sooty little moth whose larvae feed on heath.*—ED.]

NOTES ON *AMBLYJOPPA LAMINATORIA* FABR.

During the summer of 1951 I reared three imagines of this insect (see sketch diagram) from thirty-five collected larvae of *Deilephila elpenor* described in *Bulletin* No. 128, p. 90. Of the three, one was a female. It is easy to determine the sex of this insect since the middle seven segments of the female's antennae are white, while the male's antennae are completely black. Moreover, the female's legs are all black, while parts of each segment of the male's legs are lacking in pigment. Some females reach a length of 28 mm.; most males are less than 25 mm. from head to tail. It is difficult to discover any reason for these differences. It is equally difficult to guess at the purpose of the white spot on the dorsal thoracic surface of both sexes and the smoky tips of all their wings.

The parasites emerge from their hosts' pupal cases at the same time as the host would have emerged, and the females live, in captivity at least, for 21 to 28 days. From this it seems likely that *laminatoria* lays her eggs in the eggs or very young larvae of *elpenor*. I placed a pair of these ichneumons in a cage with fifteen *elpenor* eggs and left them together until the parasites died, but I saw no attempt by the female to oviposit in eggs or larvae. On another occasion I saw a female *laminatoria* eagerly straddle a half-grown larva, and apparently insert her ovipositor near his hind claspers, and I have noticed several full-grown larvae bearing scars on their last segments.

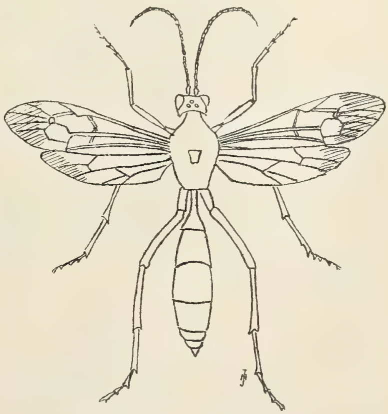
The captive female, as far as was observed, never fed on willowherb flowers, but, on more than one occasion, I saw her place her mandibles in drops of rainwater on the plant stems and apparently enjoy a good drink.

In the field I was lucky enough to find four specimens of *A. laminatoria*, all females. Three were found at rest on the leaves of willowherb plants, upon which, after diligent search, very small *elpenor* larvae, 3rd instar, were found close to the ground. It seemed as if the parasite were waiting for a suitable opportunity to attack. The fourth female was seen to settle on a willowherb plant about 4 o'clock one sunny afternoon. Careful search of the plant revealed a 3rd instar *elpenor* larva well hidden among the lower dead leaves.

Although ichneumons do not sting, one female stabbed her ovipositor into my thumb one day. The wound was very painful, and a hard lump about ¼" diameter formed and persisted for a week.

Here is an insect which will repay further study. It is conveniently attached to an insect which is already the subject of one study group's researches.

J. H. JOHNSON (1040).



Amblyjoppa laminatoria

NOMENCLATURE AGAIN

Dear Sir—What enjoyment some people seem to find in worrying over the relationship between nomenclature and Latin! Mr. Airy Shaw is shocked* (*p. 36*) by the idea that it is possible to carry grammatical Latin too far into the realms of scientific usage, and yet the object of nomenclature is merely to have names.

If Mr. Knight had discovered the Purple Hairstreak and had named it *querci*—whether or not he knew the fourth declension—the butterfly's name would be *Thecla querci*, in every way, except to the grammarians, as good a name as *quercus*. Although he recognises the genitive in *rubi* and *pruni*, the vast majority of trivial names are not that case.

Although, according to the *Index Animalium*, no-one has named any insect *querci*, *quercicola*, *quercifolia*, *quercinus* and others have been used in connection with oak-associated insects but, even so, if this butterfly had been named *ulmi*, the name would have been fixed by Article 19. It would have been no more misleading than the name *ruficollis* in a genus where every species has a *yellow* pronotum!—Yours faithfully,

Frank Balfour-Browne (340).

[**I think with his tongue in his cheek*.—Ed.]

MICROSCOPY GROUP

Following the suggestion of Mr. R. R. Broome (653) at the last Annual General Meeting, "That something should be done for microscopist members of the A.E.S.", it is proposed to form a group if sufficient interest is shown. One particular need mentioned by Mr. Broome was for information on elementary methods of entomological dissection. It is also felt that some members would welcome information on methods of making micro mounts.

Will those interested, and any who have the "know-how" and are willing to be helpful, please write to Mr. C. H. Ison (1343), enclosing stamped addressed envelope, or 'phone KEYstone 4460.

REMOVAL FROM MEMBERSHIP

Under Rule 18 the AES Council has removed from membership Mr. I. Hashimoto (1661) of 2162, 2-Nishiichinoe, Edogawaku, Japan, for defaulting on a valuable exchange with a member in England.

REVIEW

A Pocket-Book of British Moths, by George E. Hyde, F.R.E.S. Pp. 160; 53 plain and 8 coloured plates. A. and C. Black, London. 1952. Price 8/6.

The spate of elementary, incomplete pocket-books does not diminish, and one might easily overlook a good one such as this is. This small book, as explained by the Author (*in litt.*) is chiefly designed for general readers, but being written by a lepidopterist of wide experience, has far exceeded its original objective. Mr. Hyde, in his preface, reveals himself as primarily a field naturalist. He says " . . . but the study of mounted specimens, useful though it may be, is not enough. The insects must be seen alive and in natural surroundings to be fully appreciated." How true, and the theme of the book stresses this throughout. It was a pleasure to find that Mr. Hyde has included a section on the Micro-lepidoptera. We must hope this will lead to at least a few recruits to the study of these small, but beautiful and interesting moths. The introduction gives a thorough, readable and understandable account of the metamorphosis and structure of the Order and includes useful collecting hints. One error has crept in: Mr. Hyde refers to the cocoon-spinning species as belonging to several *Orders*. This should, of course, read *Families*.

The text throughout is clear and informative, in addition to being accurate. The coloured plates could be better and some are badly out of register. The photographs are direct from Nature and all but two are by the author. Mr. Hyde's reputation as a Natural History photographer stands very high. One or two are a trifle obscure, but the general standard is excellent and the subjects aptly chosen.

This book can be regarded as an entomological primer, safely to be recommended to general readers and young people interested in nature study. In the right hands, it cannot fail to increase interest in moths in particular and the Lepidoptera in general.

H. E. H.

Printed by T Buncle & Co. Ltd., Arbroath, and published by the Amateur Entomologists' Society, 1 West Ham Lane, London, E.15. 1952.

AES
ANNUAL EXHIBITION
1952

SATURDAY, 27th, September, from 2 p.m. to 5.30 p.m. at **BUCKINGHAM GATE CENTRAL SCHOOLS,** Wilfred Street, London, S.W.1.

ADMISSION FREE.

EXHIBITS. The Hall will be open from 10 a.m. for receipt of Members' exhibits. Bring along your specimens (any Order, living or set), equipment, apparatus, photographs, drawings, etc. If you require a large space, notify Meetings Secretary in advance. Please label clearly.

TALKS. Dr. C. B. Williams, M.A., Sc.D., F.R.E.S.: "Insect Migration." Mr. W. H. T. Tams, F.R.E.S.: "Uses and Abuses of Entomological Names and Terms." Mr. E. E. Syms, F.R.E.S.: "Burying Beetles."

DEMONSTRATIONS. Members will demonstrate setting of coleoptera, diptera, and lepidoptera.

GROUPS. Members of Groups who have been corresponding will be able to meet for discussion.

FOREIGN MEMBERS' EXHIBITS will be shown.

SURPLUS TABLE. If you have spare ova, larvae, imagines, equipment, books, etc., for sale or exchange, bring them along labelled with name, price, or exchange wants. No charge for use of this table.

ENTOMOLOGICAL TRADERS will be in attendance.

Offers of help and enquiries to Hon. Meetings Secretary (K. H. Bobe), 19 Hengist Road, London, S.E.12.

BRING YOUR FRIENDS AND AN EXHIBIT!

HOW TO GET THERE—

VOL. 11
No. 141

TEMBER - - 1952

THE BULLETIN OF THE AMATEUR ENTOMOLOGISTS' SOCIETY

EDITED by W. J. B. CROTCH, M.A., A.K.C.

AES
BULLETIN
No. 141
SEPTEMBER 1952

OTHER FOLKS' ACTIVITIES

MR. J. D. CARTHY, Queen Mary College, London, reports that a meeting was held at the rooms of the Royal Entomological Society of London on Wednesday, March 12th (see Proceedings C, vol. 17, No. 2, March 4th), at which, in response to a request from Professor Grassé and others, the proposal to form a British branch of the Union Internationale pour l'Etude des Insectes Sociaux was discussed. He has agreed to act provisionally as Secretary, and would be glad to hear from any British biologist who would like to join such an organisation. If the necessary response is received, steps will be taken to put the organisation on a permanent basis and to nominate Officers.

The Society of Systematic Zoology, which was formed in the United States in 1947, announces the publication of a new quarterly journal. The Secretary and Treasurer, to whom enquiries should be addressed, is Dr. R. E. Blackwelder, Room 429, U.S. National Museum, Washington 25, D.C., U.S.A. The subscription rate to *Systematic Zoology* for non-members will be 7 dollars a year.

The following description of the Netherlands Youth League for Nature Study has come to hand from its Assistant Foreign Correspondent, Miss Jannie Lok:—

In the "Nederlandse Jeugdbond voor Natuurstudie" (the N.J.N.), founded 1920, a number of Dutch youth are united, who want to study and admire Nature in joint activities. Their number is at present about 2000, divided among 65 branches in all parts of the Netherlands, which have a local committee each.

The most important form of activity of the League is the excursion: almost every branch organises each Saturday or Sunday an excursion to some place which is important for nature study. Those places are visited in one-day trips by bicycle or on foot under the guidance of a member, who has specialised himself. On these trips, which pass off in an atmosphere of good fellowship, distances of 60 or 70 kilometres are often covered.

The branches organise lectures, sometimes during which lantern-slides or films are shown, belonging to a central collection which is made by photographer-members all over the country.

The branches are grouped in eleven districts. The board of each of these districts organises during Autumn, Easter, and Whitsun holidays three- or four-day camps in areas which are too far away for the weekly excursions. As a rule they are held in nature-reserves and a farm or youth hostel is then utilised as shelter for the participants.

In the summer-camps, each year held in more extended areas, members from all over the country meet to study Nature during ten days. The evenings in these camps are used for lectures, folk-dancing, and the singing of folk-songs from all over the world. Once a year, between Christmas and New Year, at a central place in the Netherlands, a Congress is held, which is usually attended by some 500 members. Here the General Committee (the Hoofdbestuur) renders an account of its management during the past year, a new General Committee is elected and plans are outlined and discussed in a very democratic way. All the above activities are based on the free initiative of youths between 12 and 23. Each year those members, who attained in the course of that year the age of 23, are obliged to leave the League after the Congress, regardless of their place or function in it. As ex-members they sometimes give lectures or lead excursions, but they have no longer any direct influence on the course of things in the League. These provisions have made it possible to keep the N.J.N. young, and have up to now proved their value.

Every boy or girl between the ages of 12 and 23 years may join, regardless of his or her political or religious

affiliations. Therefore the organisation has always refused to form any opinion not directly connected with its objects, viz., " promotion of love and knowledge of Nature among the Dutch youth."

There is a special committee to direct individual entomologists, to combine the research of all insect-minded members. It is the task of this committee to provide identification keys for accessible groups of insects. So far, keys have been edited to the species of butterflies, dragonflies, bumble bees, water bugs, aquatic larvae and Chrysopidae; while keys for grasshoppers, Syrphidae and several beetle families are being prepared. Also the committee promotes research work, by the distribution of phenology-forms by which data are collected every year about the emergence of butterflies.

The League was the only youth organisation represented at the Conference for the Protection of Nature at Brunnen (Switzerland) in 1947 and Fontainebleau (France) in 1948. In other respects, too, the foreign activity has been greatly enlarged: the N.J.N. gave the impulse to the foundation of sister-unions in Sweden and Germany and organised in the summer of 1950 an international camp on the isle of Terschelling.

The N.J.N. publishes a monthly paper (" Amoeba ") and each year a photo-calendar, while occasionally moderate - sized publications are issued. All work in the League is honorary; there are no paid officers.

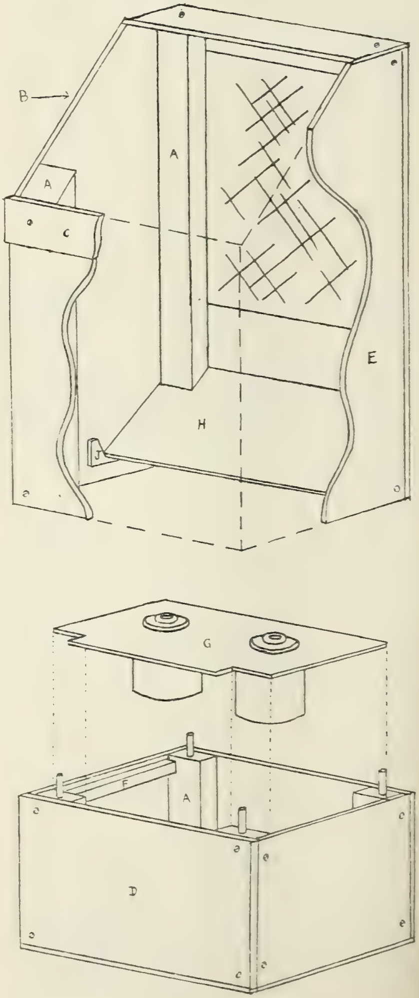
Anyone who wants to know more about the N.J.N. should write to Mr. Ernest Lewis, our General Secretary.

A BREEDING CAGE

To suggest a new type of cage in face of the AES " Practical Methods and Hints for Lepidopterists " merits some apology, but there seems to be a need for a small cage with the advantages of some of the larger ones described in that excellent booklet. I have tried to meet the following requirements:—

1. A suitable size for the one or two larvae of a species which one gets when beating.
2. Inclusion of a pupating chamber.
3. Protection of the pupating chamber from frass.
4. Easy cleaning of the feeding chamber.
5. Easy dismantling to renew food.
6. Ventilated feeding chamber.
7. Easy visibility of feeding chamber.
8. Easy construction by amateur rough carpenter.
9. Cheapness.

Make a box of 3/16th in. hardboard, 12 in. × 6 in. × $4\frac{1}{2}$ in. with $\frac{3}{4}$ in. × $\frac{1}{2}$ in. battens (A) in each corner, the back having wire gauze from $\frac{3}{4}$ in. to $5\frac{1}{2}$ in. from the top. (See figure.) It is better to use screws throughout. Place them so that they still hold the parts together after the cuts described in the next two paragraphs.



Saw off the front top at 45°, $2\frac{1}{2}$ in. each way from the top corner (B). A piece of glass will rest on here; sandpaper if necessary to ensure a good fit. Fit flange (C) to prevent glass slipping.

Saw through the box $3\frac{1}{2}$ in. from and parallel to the base. This makes a perfect fit between the pupating chamber (D) and the feeding chamber (E). Fit lugs in each corner of the pupating chamber (an old plastic knitting needle is suitable) with corresponding holes in feeding chamber.

Fix bearers (F) inside of front and sides of pupating chamber, 3/16ths below the top.

Cut floor (G) of feeding chamber to fit flush with sides and to lie on top of bearers (F) at top of pupating chamber, leaving $\frac{1}{2}$ in. at back so that larvae can pass. If properly fitted, it is easy to brush off the frass. Make two holes in this base large enough for necks of small ink bottles used to hold the water for the food. to pass through. Make rubber flanges for necks of water bottles from old motor tube.

Fit frass shield (H) over the gap by attaching notched bearers (J) to the sides of the feeding chamber, $\frac{1}{2}$ in. from its base.

Peat or other suitable material is used in the pupating chamber.

Variations of size and materials can, of course, be made to suit individual tastes.

L. W. SIGGS (243).

IMMIGRANT INSECTS

In 1951 there were 26 of the English vice-counties from which no daily-kept schedules of migrant insects were sent to the Insect Immigration Committee. Any members or teams in schools residing in the following districts are requested to volunteer to observe in future. Forms will be supplied on application to the new Hon. Secretary. R. A. French, B.Sc., at Rothamsted Experimental Station, Harpenden. Herts. The vice-counties lacking observers are:—W. Cornwall, N. and S. Wiltshire, W. Sussex. Middlesex, Berkshire, W. and E. Norfolk, W. Suffolk, Cambridge, Bedford, E. and W. Gloucester, Monmouth, Hereford, Worcester. Warwick, Shropshire, Leicester and Rutland, Nottingham, S. Lancashire, Yorkshire N.E., Mid W. and N.W., Northumberland and Cheviotland.

In Wales forms will be issued by P. M. Miles, F.R.E.S., of N.A.A.S., Trawscoed, Aberystwyth, Cardigan. In Scotland by Dr. A. C. Stephen, F.R.S.Ed., Keeper of N.H. Dept., Royal Scottish Museum, Edinburgh, 1. In Ireland by E. S. A. Baynes, F.R.E.S., of 2 Arkendale Road, Glenageary, Co. Dublin. Completed returns should be sent to these addresses on July 1st and December 1st.

In other areas observers were so active that between February 4th and May 1st, 1952, no less than 1172 Painted Lady butterflies, *Vanessa cardui* Linnaeus were reported—an unprecedented abundance so early in the season. In Morocco a mass migration to the East was reported from the Middle Atlas Mountains on March 5th; and between April 5th and 7th there was a similar migration of the Painted Lady seen at Montpellier in southern France, but this swarm was flying W.S.W.—so both were independent of our March invasion centred on East Sussex, but spreading everywhere along the south coast to Ireland. A few reached Scotland by March 24th.

T. DANNREUTHER (60).

(We must all take careful note of the new Secretary's name and address. Captain Dannreuther's name has been so familiar for so long that he will doubtless have to excuse a few letters which are sent astray.—ED.)

BUMBLE BEES (7)

(Continued from page 79)

Subgenus AGROBOMBUS Vogt
(Carder Bees)

BOMBUS AGRORUM Fabricius.
(Common Carder Bee.)

Size small.

Distribution

Common throughout Britain.

Descriptions

Queen and Worker

Head mixture of black and brown.

Thorax ginger or tawny yellow with scattered black hairs.

Abdominal segments

1. tawny or pale yellowish.
2. black or dark brown.
3 to 6. tawny.

The colour of the abdomen is very variable and in a common form it is quite black. No definite colour scheme can really be given for this species, but the general appearance is usually a tawny or ginger-coloured insect.

Hairs on the corbicula are black.

The worker is, of course, smaller than the queen.

Male

Resembles the queen in colouring.

Joints of the antennae much swollen in a posterior position.

BOMBUS MUSCORUM Linnaeus.

(Large Carder Bee.)

Size medium.

Distribution

Widespread, commonest in Scotland and Ireland; it prefers marshy situations.

Descriptions

Queen

Head yellow.

Thorax orange brown with a certain amount of yellow in front and behind.

Abdominal segments

1. yellow.
2. yellow, only a trace of brown.
3. yellow, very little trace of brown.

4 to 6. yellow.

Underside of thorax and legs covered with yellow hairs.

Worker

Coloured as queen, smaller size.

Male

Coloured as queen, but even less trace of brown bands on the abdomen.

Joints of antennae only slightly swollen.

Distinguished from *B. agrorum* and *B. humilis* by:

1. Complete absence of black hairs on thorax.
2. Slightly larger size.

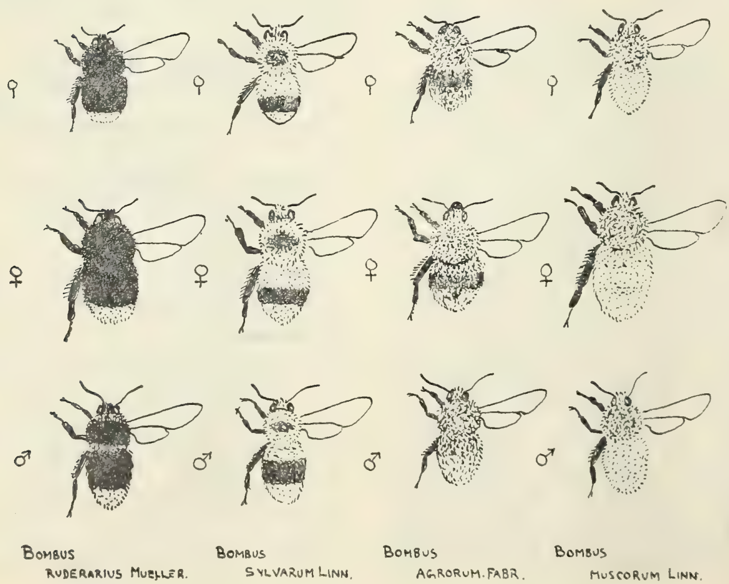
BOMBUS HUMILIS Illiger.

(Brown Banded Carder Bee.)

Size small.

Distribution

Mostly in the South and East, but not known very well, as it has been confused with *B. muscorum* in the past.



Descriptions

Queen

Colouring resembles that of *B. muscorum*; the following characters help to distinguish it from that species: —

1. There are usually a few black hairs on the thorax, especially near the wings.
2. There is a brown band on the second segment and a less marked one on the third. These bands are much more marked than in *B. muscorum*.

It is distinguished from *B. agrorum* by the fact that black hairs are never found amongst the yellow ones on the abdomen, as they are in *agrorum*.

Hairs of corbicula usually yellow as in *muscorum*.

Worker

Resembles queen in colouring, but smaller in size.

Male

Resembles queen in colouring.

The swellings on the antennae are intermediate in size between those of *B. agrorum* and *B. muscorum*.

BOMBUS SMITHIANUS White.
(Smith's Carder Bee.)

Size larger than *B. muscorum*.

Distribution

Orkneys, Shetland, Hebrides, Scilly.

Descriptions

Queen and Worker

Resemble those of *B. muscorum*, but ventral surface is covered with black instead of pale hairs.

Male

Resembles that of *B. muscorum*, but ventral surface with both black and pale hairs.

This species is often regarded as a race of *B. muscorum*.

BOMBUS RUDERARIUS Mueller.
(Red Shanked Carder Bee.)

Size small.

Distribution

Widespread and rather local.

Descriptions

Queen

Head black.
Thorax black.
Abdominal segments
1 to 3. black.
4 to 6. red.
Hairs on the corbicula red.

Worker

Resembles queen in colouring, but often only the tips of the hairs on the corbicula are red.

Smaller than queen.

Male

Head black or greyish.
Thorax black with anterior and posterior dull yellowish bands, which may be very indistinct.
Abdominal segments
1. black or dull greyish-yellow
2. black, dull greyish or bright yellow.
3. black, may be some red on it.
4 to 7. red.

Differs from male of *B. lapidarius* in the fact that segments 6-12 of the antennae are swollen behind in *ruderarius*.

Differs from *B. sylvarum* in the fact that the third joint of the antenna is distinctly longer than the fourth.

BOMBUS SYLVARUM Linnaeus.
(Shrill Carder Bee.)

Size small.

Distribution

Widely distributed but local.

Descriptions

Queen

Head greenish-yellow, black on top.
Thorax greenish-yellow, black between the wings.
Abdominal segments
1. greenish-yellow.
2. greenish-yellow, black at sides.
3. black, posterior margin greenish-yellow.

4 to 6. red, greenish-white band posteriorly.

Worker

Resembles queen in colour, smaller in size.

Male

Resembles queen in colour, but segment 4 is usually black.

Third joint of antenna very little longer than fourth.

(*To be continued*)

T. B. POOLE (1681).

OBSERVATIONS AND QUERIES

MR. J. P. C. WARD (1440) writes:—"As the Yellow Toadflax (*Linaria vulgaris*) did not appear to exist in Middlesex, I introduced some seed from Staffordshire at the end of 1950. During the following year, six larvae of the Toadflax Pug (*Eupithecia linariata*) were found feeding on the resulting flowers. The inference was that either the usual foodplant did exist in the locality or that some other foodplant was used. A search was duly made, but the foodplant was found only in one small batch, six miles from that planted (one larva being found there).

In order to prove that the Toadflax Pug does feed on other plants, it is necessary either to have more detailed information about the usual foodplant in Middlesex, or to find the larvae actually feeding on another plant (such as a related Toadflax or Golden Rod). Can any members help in either respect? I shall also be interested to hear of the distribution and presence of other Pugs in Middlesex."

MR. A. KINDRED contributes the following:—"At 9.35 p.m. (B.S.T.) on 9th April 1952 I visited my emergence cage. There were six *Dilina tiliae* and six *Laothoë populi* moths in the cage at the time. Two sets of *tiliae* were *in cop.* and one pair of *populi*, but the thing that made me sit up most was, one freshly emerged *tiliae* ♂ *in cop.* with a dead *populi* ♀ on the floor of the cage.

Records of the crossings of *D. tiliae* × *L. populi* or vice versa seem to be very few, but a record of one species *in cop.* with a dead specimen of the other must be much rarer."

P. SKIDMORE (1705*) records:—"On 17th February this year, I caught, along with several of the SPHAEROCERIDAE, one female and two males of *Lonchoptera furcata* Fallén. Males of this species are very rare, I believe, whereas the females are quite common. It was suggested to me by the curator of the local museum, who identified the insects for me, that the males may be nocturnal fliers and for that reason rarely seen. The specimens I caught were found during the afternoon under a sheet of corrugated iron lying in a damp part of the garden. The commoner *Lonchoptera lutea* Panzer I have bred from small larvae found under stones and other débris lying on the ground."

On this last observation, Mr. L. PARMENTER comments:—"In 1938 Mr. J. E. Collin ("The British Species of Lonchoptera," *Ent. mon. Mag.*, **74**, 60-6,) suggested that *L. furcata* was crepuscular. I found *L. lutea* in Mr. T. Trought's catches in his light trap. For further reading on their life histories see Sir John Lubbock, 1862, in *Trans. Ent. Soc. Lond.* (3) i: 338-44 and J. G. H. de Meijere, 1900 in *Zool. Jahrb. Syst.* Little is known of these small flies except that they occur abundantly in the adult state on long grass and are mostly females. There is, therefore, much still to be learnt, and our young member might like to enlarge on his notes, checking whether the species are definitely nocturnal, sketch larvae, pupae, etc., and circulate his results around the circle of AES members who are interested in Diptera, asking for further data. From some such co-operation it might be possible to stimulate the formation of a Diptera Group within the Society. One further suggestion—one should always give the name of the entomologist who identified the specimens."

Another new Junior member, TONY HARDMAN (2050*) writes:—"At 12.15 p.m. on the 19th April 1952, I was walking near the river Mersey, East Didsbury, Manchester, when I noticed on the ground a Small Tortoiseshell butterfly (*Aglais urticae*). Its wings were folded over its back and it was motionless. As my shadow fell across it, the wings began to open slowly until they were fully spread out. Again it lay motionless. I took my shadow off it and the wings slowly began to close. I repeated the experiment several times, but always with the same result. At last it took flight and disappeared over the hedge."

[*This was rather odd, because the reverse re-action usually happens.*—ED.]

Miss URSULA BURRAGE records that:—"Having no bramble nearby on which to feed my Emperor Moth larvae, I had to offer them cultivated rose. As it was a strange plant to them, I watched one under the binocular microscope on a leaf of freshly washed rose. This (third instar) *S. pavonia* larva carefully walked all over the leaf, not eating, until it came to a very small drop of water. It then stopped and drank it, still making no attempt to eat. It had changed its skin only the previous night. I offered it three further drops, which it drank. It then began eating, but ceased after having consumed about a quarter of a leaflet. I offered it more water, but with no success; I then placed before it a drop of water in which a rose-leaf had been crushed, and this was taken eagerly. I wondered if perhaps the leaf was too unlike a bramble in texture to be acceptable, but the " taste " was correct? I should be grateful for any explanation of this behaviour, and to know whether it is common for larvae of this or related families to drink water as such."

[*Many exotic Saturniid larvae undoubtedly drink. Those native to sub-tropical areas are best kept in almost unventilated cylinder cages, when reared in this country, and I have often seen larvae stretching away from a leaf to reach the condensation on the sides. They quickly clear a semi-circular area which looks as if a miniature car-screen wiper had been at work. Eating is no doubt a chemotactical response; it is said that Garden White Caterpillars will eat almost any leaf if it has been smeared with the essential oil from a cabbage leaf. Records of other instances would be welcome.*—ED.]

PROBLEMS FOR SOLUTION

As a relatively new member of the Society, and as one who is profoundly ignorant of the biology of insects which seems to form the chief interest of many members, I was greatly interested in Mr Tesch's note on " Our Origins " which opened the January *Bulletin*. He mentions that the main reason which led him to founding the AES was the hope that it might solve some of his problems—notably the death of his larvae for no apparent reason, the failure of pupae to emerge, the refusal of the newly-born to eat, the failure of apparently eligible partners to mate and other problems of behaviour. To what extent has his hope been realised?

I am aware that his problems are some of the most difficult with which amateurs can be confronted and that it is much easier to pin out specimens in collecting cabinets and to swop specimens with other members, rather like schoolboys collecting stamps, than to plan and carry out what amounts to a physiological investigation. As a new-comer to Entomology, I know very little about these things, but like Mr. Tesch, I should like to know more.

Can, for instance, the larvae of the cabbage-butterfly feed equally well on any member of the Order Cruciferae; and if not, why not? The Solonaceae are characterised by the fact that most of them produce somewhat similar poisons, salanine, atropine, hyoscine, byoscyamine and, therefore, their metabolism and chemical make-up have some similarity. If there are any lepidopterous larva that favours one species of the Order, can it be nourished equally well on other members of that Order? To what extent can satisfactory substitutes be found for the normal diet of any particular insect and what factors limit the number of such substitutes?

I realise that all these points may have been investigated and, if so, I should be grateful to members who can fill the lacunae in my knowledge. I have put them forward merely as examples of the sort of thing which really interests me in Entomology; there are perhaps many other problems of great importance arising out of Mr. Tesch's original list which still await investigation. I notice that the study groups are well aware of this and that action is being taken to study some of the problems. It is greatly to be desired that such study should be intensified.

J. M. HAMILL (2010).

A short answer to Dr. Hamill might be given by mis-appropriating the famous words *Si monumentum requiris, circumspice*: if you want evidence of our acquired knowledge, look at our *Leaflets*! I am sure that there exists in the minds of members a considerable store of knowledge about foodplants and dodges (for example, that the Garden Tiger moth, *Arctia caja* Linn., if kept practically in the dark in an airing cupboard and fed on the unlikely food, cabbage, will become continuously brooded—a fact most useful for geneticists). Members of the Silkmoth Group have proved

that species apparently extremely specialised to a foodplant in nature will, in captivity, accept leaves of plants botanically very far apart from it; and indeed reach unusually large size when allowed to browse upon several genera, which in total seem to provide an ideal diet.

Few members would, however, have enough bio-chemical knowledge to begin converting their " know-how " into answers to Dr. Hamill's more esoteric questions. Nevertheless this is a fruitful subject for further contributions to the *Bulletin* and the Editor looks forward to receiving notes which will be of use and interest to us all.

TOWARDS A NEW NOMENCLATURE

A NOTE ON *Xestobium rufovillosum* DEG.—In a provincial hotel lounge a gentleman with a penetrating voice was making reading impossible. His discourse, addressed to all and sundry, covered a wide range of topics. He was, it seemed, an architect and had worked on some very large projects. Yes, of course he knew all about the death watch beetle, which brought him thousands of guineas in fees. It was unknown in this country before the year 1904, when it was introduced in numbers from U.S.A. Its Latin name, which speaks for itself, is *refusulosum* (sic), so named because of its action on the wood. His account of its life history might prove misleading in foreign translation and is therefore omitted!

C. MACKECHNIE JARVIS (650)

REVIEWS

Handbooks for the Identification of British Insects. Hymenoptera: 2. Symphyta, section (a) by R. B. Benson. Published by the Royal Entomological Society of London, 1951. Price 10/-.

This is the first section of a work on the British Sawflies, Stem Sawflies, and Wood Wasps. The complete work is to be published in four parts. This part deals with the identification of adults of the families: Xyelidae, Pamphiliidae, Megalodontidae, Xiphydriidae, Siricidae, Cephidae, Argidae, Blasticotomidae, Cimbicidae and Diprionidae. It consists of some 49 pages with 127 detail drawings of those parts of the adult insect that are used for identification.

These Handbooks generally contain a short account of the life-history of the insects described, but in this section a reference is made to a paper on this subject by the author published in the *Trans. Soc. Brit. Ent.* 1950, **10**: 45-142. Otherwise the work follows the general plan; giving first a Key to the Families and then a Key to the Species. These Keys also indicate the food plant of the larva, time of appearance, and distribution of the species.

Details of the larvae and their identification are to be published in part four of this work.

This will become the standard reference book on these insects, so all those interested in Hymenoptera should secure a copy. E. E. S.

The Irish Conopidae (Diptera) by K. G. V. Smith, F.R.E.S. *Proc. Royal Irish Academy*, **54**, Ser. B, 203-8, 1952, published by Hodges, Figgis & Co. Ltd. of Dublin. Illustrated. Price 6d.

Undoubtedly all British dipterists should get this cheap and useful key to the British species, for our member, K. G. V. Smith, besides giving the Irish localities, adds British distribution and some notes on the habits of all the species on the ' British List.' It is hoped that members will add to our knowledge of the habits of the species even if only to note the flowers to which the Conopidae are attracted.

It is a pity Mr. Smith omitted from his references Colyer and Hammond's " Flies of the British Isles " in Warne's Wayside and Woodland Series (reviewed in *AES Bulletin*, *Vol. 10*, p. 108), because Hammond's beautiful colour plates of *Conops*, *Sicus*, *Physocephala* and *Myopa* will assist and entrance all new students of this family of flies. L. P.

THE JULY CROSSWORD

If one in four members had sent in their solutions, we should have had enough stamps for the despatch of one issue of the *Bulletin*, a welcome relief to our finances. In the event, only seven members responded (Nos. 919, 1139, 1525, 1573, 1945, 2025 and 2043) and all get prizes!

The solutions to the clues were: any, emmet, seer, paged, uno, bow, lend, if, Cromer, awe, test, inch, *Odonata*, Norn, sow.

Printed by T. Buncle & Co. Ltd., Arbroath and published by the Amateur Entomologists' Society, 1 West Ham Lane, London, E.15. 1952.

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AES
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1952

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ADMISSION FREE.

EXHIBITS. The Hall will be open from 10 a.m. for receipt of Members' exhibits. Bring along your specimens (any Order, living or set), equipment, apparatus, photographs, drawings, etc. If you require a large space, notify Meetings Secretary in advance. Please label clearly.

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GROUPS. Members of Groups who have been corresponding will be able to meet for discussion.

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SURPLUS TABLE. If you have spare ova, larvae, imagines, equipment, books, etc., for sale or exchange, bring them along labelled with name, price, or exchange wants. No charge for use of this table.

ENTOMOLOGICAL TRADERS will be in attendance.

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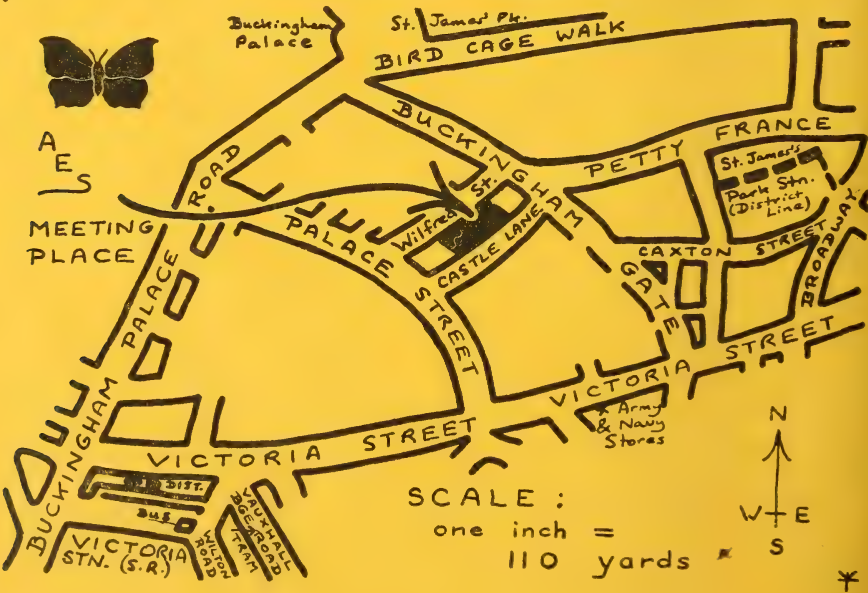

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EDITED by W. J. B. CROTCH, M.A., A.K.C.

A E S BULLETIN

No. 142

OCTOBER 1952

A NEW VENTURE

Our only publication in 1952, apart of course from the *Bulletin*, represents a new venture in that it links ornithology with entomology. It is leaflet No. 24 "The Entomology of Bird Pellets" and has been specially written for the A.E.S. by Mr Philip M. Miles, F.R.E.S. It is illustrated with four full page plates and contains a table of food preferences among insect orders of forty-one familiar British birds as well as a key to the identification of bird pellets.

Members will find that the possession of this Leaflet will widen their own outdoor interests: we hope too that they will bring the publication to the notice of all their bird-watching friends. It costs one shilling and sixpence (plus three ha'pence postage) and can be obtained from the Honorary Publications Manager, Mr C. B. Pratt, 1 West Ham Lane, London E.15.

●

A LONDON LAMENT

Contributions to the *Bulletin* by town-dwelling members often set me wondering how they overcome their peculiar difficulties. In the case of the breeder living in London, the snags seem to fall under four main headings:—

A. Lack of space (indoors).
B. Lack of space (outdoors).
C. Lack of foodplants.
D. Lack of conjugal cooperation.

The most serious and ever-present obstacle is "D." First, my wife had to be convinced that it was necessary to start such a dubious hobby at my time of life. This called for a certain amount of ingenuity.

A profession that entails working until the small hours, for weeks at a stretch, is conducive to insomnia. I recalled that a certain film director and fellow-sufferer, who slept in a caravan while on location, used to hypnotize himself before turning in by gazing at a tank of tropical fish. Could anything be more relaxing, I argued, than the rhythmic browsing and leisurely perambulations of a number of caterpillars?

The "A" clause means that the limit of feminine tolerance must be finely gauged. Entomological experiments are confined to my alternative accommodation, a small garage flat in the Swiss Cottage district. This is known as the "hide-out," being the only place where I can get through my work without constant interruption.

The number of species that can be reared at a time is naturally restricted, but the hide-out has three assets: the bathroom, the spare room, and an anthracite stove of ancient vintage.

The first gets any sun that is going through opaque glass windows, and is nearly as good as a heated greenhouse. The old-fashioned lid to the bath is a convenient support for rows of cages—until someone wants a bath.

The spare room is invaluable for the larger Saturnids such as *Attacus edwardsii* and *Antheraea* species (*pernyi*, *roylei* and *mylitta*). Larvae are started in the bathroom and later turned loose on four-foot branches wedged in cans of water. Newspapers trap most of the frass. The chief drawback is that any visitor hoping for a shake-down is unlucky (more "D" trouble here).

The stove has helped to make me a star turn in the Silkmoth Group—or, as some will have it, the supreme example of mug's luck. The central heating effect accounts for some excellent results with tropical and semi-tropical species.

The Group owes a great deal to Mr. A. L. H. Townsend (1691). By air-mail from Nakuru, Kenya Colony, comes a steady supply of ova, including several spectacular species which, as far as is known, have not previously been reared in this country. Nothing, to my mind, equals this aspect of the hobby—the doubts and anxieties, the rich rewards. Will the eggs hatch? Can a larva which feeds in the wild on pepper tree, acacia thorn, camphors and suchlike, be persuaded to accept a substitute of an entirely different nature? (Most Nakuru larvae, strangely enough,

feed voraciously on our hawthorn and fruit trees; others, grass-feeders by necessity in a land of scanty vegetation, do well on a diet of London grasses). After each moult the larva takes on a yet more fantastic colouring. Finally, the emergence of the moth—always more striking than one had expected—and the hope of a successful pairing.

As for " B," a small patch of rubble has to serve as a " garden." No facilities for sleeving, but it maintains a fine crop of nettle, dock, groundsel and white deadnettle for my Tigers—*Arctia caja* and *villica*, *Euplagia quadrupunctaria* and *Parnaxia dominula*. The Garden Tigers are continuously brooded and one day I may find time for some intelligent selective pairing. The Creamspot is more tricky, and few come through the winter in spite of attempted " natural " conditions.

I wasted a lot of time on the small Jersey Tiger larvae by keeping them on growing foodplants (which wouldn't grow) by an open window—the latter causing more " D " friction during icy spells. The idea was to avoid disturbing the torpid larvae when changing cut food, but I found a simpler method was to keep them in the heated living-room—the result being a mass emergence of moths in early April! The Scarlet Tiger is double-brooded and the easiest of all to rear.

The " garden " also grows carrots (the tops seem to be just as good as fennel for Swallow Tails), spurge for the beautiful Spurge Hawk (*Celerio euphorbiae*) larvae, and willow herb for the Elephant Hawk (*Deilephila elpenor*)—I find a few nearly full-grown larvae each year, sunning themselves in mid-afternoon.

The "C" difficulty in my case is almost non-existent. I relied at first on nocturnal depredations, but neighbouring gardens got a break with the discovery of vast bomb-site jungles within a few minutes' walk of the hide-out. These provide unlimited food for every kind of larva, native or exotic, which so far has come my way. Two unknown trees, obviously of foreign origin, contributed to this season's high-spot—the rearing of the incredible " Hickory Horned Devil " caterpillar of the North American *Citheronia regalis*.

It will be gathered that I have no notions of concentrating on any particular family of lepidoptera. Almost anything is acceptable, subject to an important proviso under heading "D." A larva is only tolerated (and grudgingly at that) if my wife considers it " amusing." Repeat performances, except in very rare cases, are strictly barred.

Fur coats are an asset, especially those of *A. caja* (length and gloss) and of an African Lasiocampid (elegance and texture) supplied by Mr. Townsend. The Pale Tussock (*Dasychira pudibunda*), which appeared last summer on bomb-site hop, passes the test. So do other species with " shaving brushes " like the Scarce and Common Vapourers (*Orgyia recens* and *antiqua*).

With reference to a note by Alan Kindred (1707) in the October *Bulletin*, a number of *O. recens* of both sexes emerged at the same time in a smallish cage, but the males made no response to energetic calling by the females. Thinking that fresh air might be beneficial, I put the cage (minus lid) by an open window. The male *recens* promptly made a mass take-off, to be replaced by a throng of our local *antiqua*. They duly paired with the female *recens* but the eggs proved infertile.

Other species with permits are the Miller (*Apatele leporina*), Sycamore (*A. aceris*) and Poplar Grey (*A. megacephala*), all fairly common in this district, but the moths are pronounced " dull." The Puss Moth (*Cerura vinula*) is a hardy annual and the rodeo at pupation time invariably causes a domestic crisis. I find it impossible to rear this species in cages, so the larvae live on a large poplar branch in the spare room. There seems no end to their perversity in choosing a site for spinning. A *vinula* cocoon in a court shoe presents a rare problem; so does a hard lump in the eider down; but the worst disservice of all was done by the creature that got among my books. It had two hundred or more to choose from, of no particular value—with one notable exception. Why should the larva select a rare edition which, like the usual book-borrower, I should have returned many months ago to its owner?

M. Harrison-Gray (1806).

FOOTNOTES ON PSYCHIDS

In the *Bulletin*, *Vol. 10*, p. 55, I made a suggestion about the method by which a Psychid pupa might be propelled outwards from the larval

case when ready for emergence. Further experience, with more material, has shown me that this suggestion is not correct. The pupa comes out in a series of jerks; but no dehiscence takes place until the thoracic segments are quite clear of the case, so that the legs are clearly *not* used for propulsion.

The pupa-shell is furnished with pairs of short-tooth combs, placed transversely on the dorsal side of the abdominal segments, there being about 20 to 25 teeth in each comb, pointing slightly backwards. The first comb of each pair is near the rear end of one segment, the second near the front end of the next. It is, I think, quite clear that, by alternately " arching " and straightening its back, and by contracting and elongating its abdomen, the pupa can cause the combs to grip, release their grip, and then take a fresh grip of the silk lining of the case; thus propelling itself towards and through the anal opening, until the leg-, antenna-, and wing-sheaths are quite free. Dehiscence then occurs: the abdominal part of the pupa-shell remaining firmly fixed in the case.

In the female pupa, which does not emerge at all from the case, these combs are present, but not fully developed.

In Seitz's " Macrolepidoptera of the World " it is stated that the cases of the Psychidae have often one stick very much longer than the others. This is certainly so. But the writer goes on to suggest that this long stick may be used as a perch, during copulation, by the male moth: and here I cannot agree. For, if this were the purpose, the long stick would surely be found only on those cases that contain female pupae. When it is present on these, it is possible that the male makes this use of it. Examination of a number of larval cases has provided the following data:—

Total number of cases examined	47
Cases provided with a " perch "	26
Cases without a perch	21

Of the 26 cases with perches,

Those containing male pupae ...	15
Those with female pupae	11

Of the remaining 21, without perches,

Cases containing male pupae ...	10
Those with female pupae	11

The occurrence of a long stick appears, therefore, in *Clania* species, at least, to be purely fortuitous.

A. L. H. Townsend (1691).

(Members will wish to share our congratulations to Mr. Townsend on his being elected an Honorary Life Member of the East Africa Natural History Society in recognition of his very notable contributions to knowledge of the lepidoptera of the area. We hope that his reports on exotic Psychids will stimulate observation of our British species: interesting new material is always welcome to the Editor and (he hopes) to the membership.)

LARVAL ENTERPRISE

Sometimes an insect co-operates by synchronising its more interesting activities with the amateur lepidopterist's leisure-time. Then it is possible to gain an insight into the adaptable ways of creatures which are usually credited with little intelligence or enterprise. The following brief notes may, therefore, be of some interest to novices, particularly if they have not yet learned the wisdom of the admonition to stand and stare.

A full-fed larva of the Pale Tussock moth (*Dasychira pudibunda*), captured in Surrey one October day, was placed in a 1-lb. jam-jar, together with a single large leaf, the length of which fell a little short of the inside height of the container. The following day it was observed that the outer edges of the leaf had been drawn loosely together so that the whole of the leaf was folded longitudinally, leaving only the whitish under-side exposed. In the commodious chamber thus formed the pre-pupa had secreted itself.

Subsequent examination showed that the small portion of leaf-stem had been attached to the neck of the jar by a silken thread, so that the folded leaf dangled independently with its tip just clearing the bottom of the jar. Tests showed that the leaf swung quite freely, whether from side to side or in circular fashion; there being no other attachment or " anchorage " at any point.

One evening the following April, while I was preparing notes and specimens for a natural history class, a perfect male obligingly emerged, thus affording me an excellent opportunity to demonstrate

to the students—all beginners—(1) that moths, though not generally considered intelligent animals, can adapt themselves very well, in the matter of forming cocoons, to conditions obtaining, even in captivity; (2) how the soft greys of the freshly-emerged Pale Tussock harmonise with the downy white or grey of a leaf's underside. PETER MICHAEL (748).

BUMBLE BEES (8)

(*Continued from page 90*)

THE CUCKOO BEES

(Genus *Psithyrus* Lepeletier.)

PSITHYRUS RUPESTRIS Fabricius.
(Hill Cuckoo Bee).

Size large.

Distribution
Occurs in regions where its host, *Bombus lapidarius*, is common.

Descriptions

Queen
Head black.
Thorax black.
Abdominal segments
1 to 3, black.
4 to 6, red.
Wings dark brown.
Sometimes a very dull yellow band on the front of the thorax.

Male
Head black.
Thorax black, often with traces of dull yellow anterior and posterior bands.
Abdominal segments
1, 2, black, sides and edges often dull yellowish.
3, black.
4 to 7, red, may fade to yellowish.
Distinguished from similarly coloured specimens of the genus *Bombus* by generic characters.

PSITHYRUS RUPESTRIS FABR

PSITHYRUS VESTALIS Fourcroy*.
(Vestal Cuckoo Bee).

Size large.

Distribution
Commonest in South and East. Parasitic on *B. terrestris*.

Descriptions

Queen
Head black.

PSITHYRUS VESTALIS. FOUCRIER.*

* The legend of the drawing is incorrect.

Thorax black, with a deep yellow band in front.
Abdominal segments
1, 2, black.
3, black, yellow at the sides.
4, white.
5, white, black in the centre.
6, black, shiny dorsally.

Male

Head black, with some yellow hairs on top.
Thorax black, with an anterior yellow band, and sometimes a narrow yellow posterior band.
Abdominal segments
1, black, may be yellow.
2, black.
3, black, yellow at the sides.
4, 5, white.
6, white, black in the middle.
7, black.

Differs from *Ps. bohemicus* in the fact that the third segment of the antenna is shorter than the fifth. They are equal in *bohemicus*.

PSITHYRUS BOHEMICUS Seidler.
(Gypsy Cuckoo Bee).

Size medium to large.

Distribution

Commonest in North and West.
Parasitic on *B. lucorum*.

Descriptions

Queen

Head black.
Thorax black, with a lemon-yellow anterior band and sometimes a trace of a posterior one.
Abdominal segments
1, 2, dark grey.
3, black, pale yellow at the sides becoming white.
4, white.
5, white, black in the middle.
6, black.

Male

Head black, yellow on top.
Thorax black, broad lemon-yellow anterior band, narrow posterior one may be present.
Abdominal segments
1, yellow.
2, black.
3, black, pale yellow or white at sides.
4, 5, white.
6, white, black in the middle.
7, black.

A variety occurs in which the white on segments 4-6 is replaced by yellow.

♀

♂

PSITHYRUS BOHEMICUS. SEIDL

♀

♂

PSITHYRUS CAMPESTRIS PANZER

Distinguished from male of *Ps. vestalis* by the following characteristics: (1) antennae appreciably shorter, (ii) third joint of antenna equal to fifth.

PSITHYRUS CAMPESTRIS Panzer.

(Field Cuckoo Bee).

Size medium.

Distribution

Widely distributed, common in some places.

Parasitic on *B. agrorum* and *B. humilis*.

Descriptions

Queen

Head black, may be yellow on top.

Thorax black, broad yellow band anteriorly and broad yellow band posteriorly. (In melanic specimens the yellow bands may both be absent or just the posterior one absent.)

Abdominal segments
- 1, 2, black.
- 3, black, yellow at the sides anteriorly.
- 4, 5, yellow, black in the middle.
- 6, black.

Melanic specimens: abdomen may be entirely black.

Male

Head black, yellow on top.

Thorax black, broad yellow posterior and anterior bands.

Abdominal segments
- 1, yellow.
- 2, black.
- 3, yellow, often blackish in centre.
- 4 to 6, yellow.
- 7, black.

Melanic Males

Often entirely black, usually the sides of segments 4 and 5 of the abdomen are dull yellow. Intermediate specimens (see illustration) are found.

(*To be continued*)

T. B. Poole (1681).

A SERIES WHICH TOOK TWELVE YEARS TO ACHIEVE

Except for those collectors who live in the North Country, and particularly, so far as England is concerned, in the Counties of Cumberland and Westmorland, the attainment of a reasonable series of *Erebia epiphron* (Mountain Ringlet) is normally accompanied by a considerable amount of disappointment and frustration.

The only English localities are in the Lake District, where this butterfly is found in various places at and above 2,000 feet. It is a characteristic of this area that though the skies may be clear elsewhere, the mountains often have the unfortunate effect of creating a cloud formation which obscures the sun in those localities where *E. epiphron* occurs. As it flies only in sunshine and, immediately the sun becomes obscured, disappears among the roots of the grasses growing in its partially boggy haunts, casual visits to its haunts are seldom successful.

In 1940, during a week spent in Westmorland, I made three separate visits to a known locality when the conditions seemed favourable, but because of sudden changes in weather conditions I had no success: but on a fourth occasion when the weather just as suddenly changed for the better, one single specimen was captured in flight in a place where it was not expected.

No further opportunities presented themselves for visits to the Lake District at the right time until 1950. Once again after having toiled up the necessary two thousand odd feet under conditions which seemed reasonably to promise sunshine later, I spent the whole of the remainder of the day among the mist and cold winds around Esk Hause. To add to my disappointment, the very considerable views down Borrowdale and the Langdales showed that the lower ground was bathed in sunshine throughout the day. A very extensive search for resting specimens was made over the exact locality, but the sole result of it was one Small Heath (*Coenonympha pamphilus*)!

In 1952 a week's stay was arranged in the Lake District from the 28th June and a very determined effort was made to achieve success. The first few days presented the usual conditions of cloud over the mountains but sunshine elsewhere. On the Wednesday, with the days of the week steadily

running out, a chance was taken and the ascent made once again from Wastdale Head under generally cloudy conditions; but it was noted that the clouds seemed a little higher and the wind was coming from the North West. It was hoped that the clouds might lift and eventually disperse by the afternoon. I arrived at the correct spot shortly after 3 p.m. The sun began to break through occasionally, but still there was no sign of any flight. By great good fortune, one specimen was found with wings half open, encouraged, no doubt, by the occasional two or three minute glimpses of the sun which shortly after this ceased to be visible. Although a very careful search was made, no further specimens were seen.

On Thursday the clouds were very much higher and by 10 a.m. the sky was practically clear, so I decided that the attempt should be made from Seatoller up Borrowdale, and the climb commenced over very rough ground at 11 a.m. in brilliant sunshine. In the heart of the mountains it was noticeable that there was considerably more cloud, but nevertheless sunshine was more or less continuous. By shortly after mid-day the first of many *E. epiphron* was observed flying very rapidly, which certainly was not expected in so small and apparently frail a butterfly. Shortly afterwards in completely windless conditions, with the sun making the day really hot, first one and then two together were captured and found to be in nearly perfect condition. A representative series was soon reposing in pill boxes, but by 2.30 p.m. the clouds had gathered sufficiently thickly over the mountains to obscure the sun and shorten drastically the spells of full sunshine. One or two *E. epiphron* were then noticed settled low on the grass stems. Shortly afterwards no specimens were to be seen although the sun, obscured by light haze, was visible intermittently.

After an hour's tramping round to enjoy the distant views of the greater part of the Lake District, the return journey was made down the rough track to Seatoller. There, tired and footsore, I was encouraged to reflect that, after many disappointments, success had eventually been attained and the butterfly, though not intrinsically of great value, would shortly hold pride of place in my collection among many others which had been obtained with far less effort.

P. Le Masurier (978).

PAIRINGS

Everything I have ever read about pairing of moths has stressed the advantage of having a freshly emerged male and female, a fact which no one will wish to deny. Although I cannot remember reading that to pair a female moth once she has started to lay unfertile ova is a waste of time, the information I have gleaned has always left me with that impression. I know that numbers of others with more experience than myself have the same idea. A recent experience of mine has caused me to change my views. During this summer I have been rearing and breeding quite a lot of *Philosamia cynthia* (Ailanthus Silk Moth) and, as the number of emergences far exceeds my requirements for specimen purposes, I leave them to fly free in the greenhouse. My cocoons are shaded and strung from the roof.

On a recent Sunday afternoon when I went out at about 3 p.m., one solitary female hung from her cocoon, having emerged three days before and on two successive nights laid in all about a dozen unfertile ova. I returned soon after 7 p.m. to find that during my absence a male had emerged from one of the nearby cocoons, dried its wings and was already paired with the female. The pairing of this species in brilliant sunlight is in itself, I believe, unusual. I did the only thing one could do under the circumstances and put the female in a laying box. Rather more than a hundred ova were laid that night and laying then ceased. Later the same Sunday night another pair of moths emerged and paired, so that I had ova from a normal pairing for comparative purposes.

In due course both batches of ova hatched on the same day. About 80% of the ova from the delayed action pairing proved fertile. My limited facilities for rearing prevented my rearing the whole of each brood, but up to the time of writing both have kept perfect time with each other; both completed their second moults at the same time and are the same size. There have been some casualties, but the proportion in each cage has been about the same, and for the same reason, so far as I can see, i.e. the breaking away of the foothold before the moult was complete.

Naturally I do not suggest that one should spurn the use of freshly emerged partners when such are avail-

able, but emergencies do arise when the possession of this knowledge may be helpful. It may not work with all moths and the length of time for which a moth has laid unfertile ova is almost sure to be a governing factor. Some deliberate experiments would appear to be worth while. I should be glad to hear of any results.

W. R. Smith (1641).

Comment—It would seem that there may be at least two good physiological reasons for this widely-held opinion. Firstly, those females which hold egg-laying in check for as long as possible if they have not paired are apt to give up "calling" once oviposition has begun: the chance of their pairing thereafter is accordingly much diminished.

Secondly, the act of pairing introduces the spermatozoa of the male into a retaining sac in the female (the spermatheca). The outlet of this sac is in the oviduct. Once ova have begun to pass down the oviduct, there must be a serious risk that the spermatheca is blocked off by advancing eggs during the pairing. On the other hand, there must often be a good chance (as in Mr Smith's instance) of access being normally open at the critical moment. I have had similar good luck with another silk moth this year — *Antheraea roylei* — of which species the female is so swollen with eggs that she tends to lay on the first night, and certainly on the second, if she is disturbed without being paired.

W. J. B. C.

REVIEWS

British Pyralid and Plume Moths by Bryan P. Beirne, Ph.D., etc. Pp. 208, 405 figs. (including 216 reproductions from direct colour photographs). "Wayside and Woodland Series." Price 21/-.

The Larger British Moths by R. L. E. Ford, F.R.E.S., F.Z.S. Pp. 224, with colour plates and line drawings. "Observer Book Series" No. 14. Price 5/-.

Both books published by Frederick Warne, London, 1952.

Apart from Mr. L. T. Ford's *Guide*, published in 1949 by the South London Ent. Nat. Hist. Society, very little has been produced this century on the Micros, and Dr. Beirne's book, which is in effect a continuation of South's "Moths of the British Isles", is what we have all been waiting for. The author has concentrated upon the Pyraloidae, which are on the whole the largest of our Microlepidoptera. They embrace the lacy Pyraustids and the Plume Moths which fascinated one's boyhood, but were either mysteriously absent from the only ready reference books or else only cursorily noted. They also cover many of the pests of stored food and tobacco.

The colour plates (all entirely new photographs) are, as usual, dispersed throughout the book, but an interesting innovation is the concentration of all line drawings in an initial section (pp. 18-46). Figures 184-189 are ingenious and extraordinarily informative terrestrial "elevations" showing typical habitats and foodplants.

There are keys to sub-families and genera and the text deals comprehensively with range, habitat and habits. A close study reveals what large gaps there are still in our biological knowledge of many species. Here is a rich field open for the enquiring amateur, now that he has this scholarly vademecum. It can be unreservedly commended.

The second, smaller and briefer book, does not profess to break new ground. A knowledgable and practical descriptive text accompanies the illustrations of the larger moths and some of their larvae and pupae. All are taken from South.

This is a suitable gift for the youngster who has begun to notice insects. Just because it is an observer's book, one wishes that the pictures could have shown the appearance of the insects seen at rest outdoors and not as set in a collection; but this would have meant new photographs and new colour blocks which at present costs were probably out of the question. Nevertheless, the publishers might have included, say, the Bufftip, one Hawkmoth, one Lasiocampid and one Yellow Underwing in resting position without facing financial disaster.

W. J. B. C.

Mr. H. C. Mills (1228), President of the Essex Beekeepers' Association, has kindly sent the Editor a copy of their *Yearbook*, 1952. It includes the tenth Annual Report of the Honey Harvest, that for 1951, a poor year in their neighbourhood. Only the month of July redeemed an otherwise continuous record of depressing conditions discouraging to bees. This Yearbook (32 pp.) can be bought for one shilling.

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EDITED by W. J. B. CROTCH, M.A., A.K.C.

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WINTER COLLECTING OF COLEOPTERA

Although for the lepidopterist the winter is a very inactive time, as far as actual collecting is concerned, the coleopterist can continue his efforts unabated for so long as the weather is not too frosty. Beating and sweeping, of course, will be fruitless, because all the mature plant feeders (Phytophaga) have hibernated; but decaying vegetation, moss, straw and the like will still prove productive, and I have found flood refuse to yield very good results. What species one can expect to take depends upon the nature of the region through which the rivers and streams flow, but there are several species which can be expected in almost any part of the country. Nor is this type of collecting confined to the larger rivers. I have found the small streams of Devon and mere water-trickles down the cliff face of the Aberdeen coast to yield very good species. Given mild weather, prolonged rains and a fast flowing stream which passes through a varied countryside and overflows on to low-lying meadows, the chances of success are good. In old clothes and gum boots, with the usual sheet, large-mesh sieve and glass tubes, we can set off with justifiable confidence.

Should the water still be rising and spreading, the extreme edge often has a floating mass of small twigs and broken reed-stalks. We spread our sheet, open our folding sieve and get our boxes of tubes in readiness, and skim off this débris and give it a vigorous shake through the sieve. A host of creatures falls on to the sheet and beetles are perhaps more numerous than most others. Spiders, centipedes and thrips, plant-bugs and snails, fall and struggle on the sheet. There are beetles of almost every family, but it is really only the Staphylinidae with which I personally am concerned, so we will concentrate on them. Having suffered typhoon and flood, they now find themselves in an earthquake upheaval. But they quickly recover and so commence moving off, whilst others "lie doggo" for some time before extending a cautious antenna from beneath the sifted débris. All, however, move more slowly than during the warmer weather, even the common little *Tachyporus* lacking the speed with which they travel in the spring sunshine. We are almost sure to take three species of this genus: *T. hypnorum* F. which can be distinguished by its blackened thorax, *T. chrysomelinus* L., which is brighter in colour, and *T. nitidulus* F. which is smaller than its two relatives. This genus, however, requires microscopical examination for accurate determination of the species.

There are sure to be several species of the large genus *Philonthus*. Some are of considerable size. *P. politus* L., *P. tenuicornis* Muls. & Rey, and *P. cognatus* Steph., are all of much the same size and appearance, being black with metallic reflections, especially on the wing-cases. So numerous are these beetles that it is often difficult to know what to reject. During an hour's collecting one December in Devon, I took 253 specimens of Staphylinidae, representing 65 species, and there were many more which I did not take and, of course, hosts of other families were represented. These *Philonthus* species are often so much alike in the field that it is as well to take large numbers to secure those which are closely allied. *P. succicola* Thoms. and *P. addendus* Sharp are both similar in appearance to the three already mentioned, and are well worth taking, especially *P. addendus*. A size or two smaller are *P. varius* Gyll. which is sometimes found abundantly and *P. varians* Payk., and *P. jurgans* Tott. *P. sanguinolentus* Grav. and *P. cruentatus* Gmel. are species showing red on their black wing cases. A further size smaller are *P. debilis* Grav., *P. fimetarius* Grav. and *P. pachycephalus* Nordm., all to be taken quite commonly, and the midgets of the *Philonthi*—the subgenus (although it has now been raised to full generic rank) *Gabrius*—*G. nigritulus* Grav., *G. pennatus* Sharp and perhaps *G. velox* Sharp.

The genus *Quedius* is usually well represented. *Q. molochinus* Grav., *Q. laevicollis* Brullé, *Q. fuliginosus*

Grav. and *Q. subfuliginosus* Britt. are all common species, whilst *Q. fumatus* Steph., *Q. maritimus* Sahlb. and *Q. semiobscurus* Marsh. are often present on the sheet. A very brightly coloured species will soon be conspicuous, moving over the débris. This is *Paederus litoralis* Grav., or perhaps *P. riparius* L.—we have four species of this very large world-wide genus, and they are mostly brightly coloured, with reds, blues, greens, violet and black, usually in well-defined contrasts.

The long, narrow, parallel *Xantholinus* species, especially *X. fracticornis* Müll., and *X. linearis* Ol., move snake-like through the rubbish.

Having paid our first attention to the rather faster moving beetles, we shall possibly find a number of flatter, broader species which are moving at a slower rate. These belong to the various genera in the *Omaliinae*. Two species of *Lesteva* may be found and perhaps three species of *Omalium*. Two or three species of the *Oxytelus* genus should also be present, and a large number of smaller species from 2 to 3 mm. in length which belong to the very large genus *Atheta* with its numerous sub-genera. They are all quite energetic little creatures and mostly of a sombre colouring. The ubiquitous *A.* (*Acrotona*) *fungi* Grav. is almost sure to be present, whilst other small species such as *Ischnopoda atra* Grav., *Ocalea picata* Steph., *Corpelinus corticinus* Grav. and *Oxypoda longiuscula* Er. are often found on the sheet.

We are also bound to find specimens of the genus *Stenus*. These beetles are easily recognisable in the field by their large convex eyes which extend the whole side of the head and are separated by the narrow forehead. We have some 66 species in the British Isles. They are mostly black, but a few have an orange or red spot on each wing-case and the colour of the legs is also a distinguishing feature in some species.

Although these I have mentioned are only a few of the commonest species we can expect to take, we must always keep our eyes open for the isolated rarity which may turn up.

We cannot, of course, term flood refuse a habitat in any true sense of the word, neither will it help greatly in the study of ecology; it is, however, a very productive method of collecting and one which gives much useful material for study.

H. R. Last (117).

SCIENTIFIC METHOD IN ENTOMOLOGY (1)

The subject of scientific method in entomology has been recently brought up with such insistence in the *Bulletin*, that I feel I would like to keep the topic going by making a practical contribution. But first let me state a few ideas which I believe to be true, but which are not generally held by entomologists. Entomology is a science, and it must be dealt with in a scientific manner. Dr. C. E. M. Joad says that in order to relieve our feelings after the monotony of a week at the office, we sally forth at week-ends and proceed to kick, hit and throw things about or go and kill something. If our entomology fulfills this latter requirement in us, then we may perhaps classify ourselves as sportsmen but never as scientists.

However, insects "move in a mysterious way, their wonders to perform" and if we presume to pry, even in a hesitating and incredulous way, into these mysteries, then we may call ourselves scientists indeed.

Having satisfied ourselves that we are scientists, let us now try to get some idea of where we stand in the vast field of scientific research to-day. Most research work is carried out by teams of qualified specialists working in large institutions. However, certain branches of Zoology are not considered to be of sufficient economic importance to warrant large sums of money being spent on their investigation, and many topics of entomology come into this category. Consequently most of the research work in these topics falls upon the shoulders of amateurs like ourselves. A monumental example of such research is seen in the field of ornithology, where a vast amount of data on the habits and distribution of birds has been collected by privately operating workers, pursuing their week-end hobby.

We may consider ourselves, then, as scientific research workers in our own right, and those amongst us who are sufficiently gifted to perform research work must not squander our resources, but must avail ourselves fully of our unique position.

Now, what sort of research work can be done on insects generally? This question can be answered by classifying the subject into four groups:— (1) The recording of odd or unique occurrences which are interesting in themselves but not particularly important. (Such observa-

tions may, however, suggest interesting fields of research.) (2) The description of life histories, morphology, anatomy and histology, etc., of insects, usually with some regard to their phylogeny and evolution. (3) The collection of numerical data concerning distribution, occurrence and variation of particular species. Such records, if accurately compiled, all add up some day to give useful pictures of insect communities. (4) The conduct of experiments specially designed to obtain information about the behaviour or physiology of insects: that is to say, information which could not be got by simple observation.

Research in the first and second groups can be carried out by people who possess acute powers of observation, but not necessarily any knowledge of experimental method. However, the third and fourth groups involve the manipulation of numerical data, and in order to get the best out of such experiments we must know how to handle our material.

This at once leads us into the realm of statistics, that infuriatingly obscure subject which most of us studiously avoid if we possibly can. Nevertheless, a knowledge of the basic concepts of statistical method can help us even if we cannot do the mathematics involved, and thus we can give a greater meaning and solidity to our experiments.

One such concept is the idea of taking a sample from a population. Let us suppose that all *Pieris napi* are white. But if we take a large sample we find that some specimens are not quite white, and we can therefore infer that in the whole population of *P. napi* a certain proportion (which we can estimate from our sample) are not white. The larger our sample, the better the estimate will be. The " population " need not be a concrete one as in the case just cited, but may be imagined for the sake of the particular experiment which we are conducting.

Another basic idea is that of biological variation. The results of experiments with living things will never turn out exactly the same each time, but will be nearly the same. There will be an average value and all the results will group themselves around the average. The properties of these distributions, as they are called, are useful in assessing the significance of any results.

(*To be continued*).

P. L. Bradley (1360).

OBSERVATION ON *L. DISPAR*

J. C. Midlen (1769*) writes from Truro School:—" I have been rearing about 200 larvae of the Gipsy Moth (*Lymantria dispar*). As I was looking at one about two inches long under a magnifying glass, I discovered two red trumpet-shaped tubes on the dorsal surface of the ninth and tenth segments. I immediately put it under a microscope and found that these "trumpets", as I will call them, were to be seen on most of the segments. On the fourth, fifth, sixth and seventh segments were two small trumpets situated on the anterior side of the line of centres of the two warts. On the ninth and tenth segments two large trumpets were situated between the two warts. On the segments that had no trumpets were small warts in corresponding positions to the trumpets on the fourth segment, so there is a possibility that they may have developed from warts for some specialised function.

The two large trumpets usually had a bubble of liquid, presumably water, at the end of the tube. The small ones may have had, but I was not lucky enough to see any.

I wonder whether any other members have noticed these trumpets and, if they have, whether they can let me know their correct name and function?

Comment—Dr. E. A. Cockayne considers that the above observations are very meritorious and well-presented. (Midlen's note was accompanied by three-colour diagrams which have not been reproduced.) He states that the two large red trumpets are the mouths of dorsal glands, which are present in all Lymantriid larvae. They are, he adds, "very conspicuous in the larva of the Brown-tail moth (*Euproctis chrysorrhoea* Linn.) I think they secrete a poisonous liquid. The small red trumpets are the anterior trapezoidal tubercles and a black seta (hair) arises from each of them, and two or possibly more white secondary hairs."

[Midlen later reported that his Gipsy Moths had emerged on 1st July, a month early according to South. Since however his stock was presumably of foreign origin, there may be no particular significance in this, although in general 1952 might be described as an " early year," just as 1951 was a " late " one.—Ed.]

LETTERS TO THE EDITOR

Dear Sir,—I have recently started to mount my Coleoptera in the way recommended by the British Museum —with triangles of celluloid.

I am, however, finding great difficulty in cutting these triangles uniformly from sheet celluloid — by means of first marking out with a razor blade and then cutting with scissors. Many of the triangles cut in this way have imperfect points or have a double line down the side because of the difficulty of cutting accurately with scissors along the line marked on the celluloid.

If any members has developed an ingenious method for cutting perfect and uniform triangles, I should be very pleased to hear of it.—Yours faithfully,

P. F. Prevett (1802).

Dear Sir,—Miss Ursula Burrage's note in the September Bulletin regarding her larva of *Saturnia pavonia*, the Emperor Moth (according to my label list called the 'Empress'!) recalls to my mind that some years ago I had a brood of young *pavonia* larvae that died, apparently through being given damp bramble leaves. Damp foodplants are, of course, known to kill some larvae in captivity.

This gives rise to two queries: (i) Why should damp food kill larvae which will drink (or would it only be fatal to very young *pavonia*, the effect possibly being a tendency to diarrhoea)? And (ii) why, in fact, should occasional damp food kill any larvae in captivity, all of which obviously feed at times in the natural state during spells of wet weather?

Incidentally, when fed on broad-leaved sallow, *pavonia* larvae reach a very fine size.—Yours faithfully,

George C. Holroyd (253).

Dear Sir,—I took one (rather worn) *Hydraecia petasitis* (The Butterbur) in my m.v. light trap on 28th August at my house outside Frome.

I see that South (1933 Edition) states that it was once taken in Somerset.—Yours faithfully,

G. H. W. Cruttwell (118).

Dear Sir,—I took a male Long-tailed Blue (*Lampides boeticus*) at Luccombe, near Shanklin, at 11.30 a.m. on 30.8.1952, a cool, close day. This is the third recording for the Isle of Wight.—Yours faithfully,

John Lobb (1608).

BUMBLE BEES (9)

(*Continued from page 98*)

PSITHYRUS BARBUTELLUS Kirby.

(Barbut's Cuckoo Bee).

Size medium.

Distribution
Widespread, but not common. Parasitic on *B. hortorum*.

Descriptions

Queen

Head black, yellow on top.

Thorax, dull yellow band in front and narrower one behind; ground colour black.

Abdominal segments
1, black, may be yellowish.
2, black.
3, black, may be white at posterior edge.
4, 5, white.
6, black.

On the ventral surface of the abdomen there is a mark in the form of a crescent, interrupted in the middle posteriorly on the sixth segment. On all the females of the genus *Psithyrus* these markings are specific. This species is best distinguished by this characteristic.

Male

Head black, yellow on top.

Thorax black, broad yellow band in front and a narrower one behind.

Abdominal segments
1, yellow.
2, black.
3, black, may be some white on it.
4, 5, white.
6, white, black in the middle.
7, black.

Best distinguished from the male of *Ps. bohemicus* by absence of yellow on edges of segment 3 and by the fact that segment 3 of the antenna is shorter than segment 5.

PSITHYRUS SYLVESTRIS Lepeletier.

(Four-coloured Cuckoo Bee).

Size small.

PSITHYRUS BARBUTELLUS KIRBY.

PSITHYRUS SYLVESTRIS. LEPELETIER

Distribution

Widely distributed but not generally common.
Parasitic on *B. pratorum* and probably *B. jonellus*.

Descriptions

Queen

Head black, may be some yellow on top.
Thorax black, yellow band in front and sometimes a trace of one behind.
Abdominal segments
1, yellowish or black.
2, black.
3, white, often partly black at base and middle.
4, white.
5, dark chestnut.
6, black.

This species is quite distinct and may be easily recognised by the incurved tip of the abdomen in the female.

Male

Head black, yellowish on top.
Thorax black with yellow band in front and sometimes a trace of one behind.
Abdominal segments
1, faint yellow colour.
2, black.
3, 4, white.
5, white or yellow, centre usually black.
6, black or reddish.
7, reddish.

(*To be concluded.*)

T. B. POOLE (1681).

●

LARVAL FOOD RANGE

Dr. Hamill's note, published on p. 91, has evoked a reply from Captain Dannreuther to the particular question " Can the larvae of the cabbage-butterflies feed equally well on any member of the Order Cruciferae?" He writes:—" Dr. Hamill is referred to a paper on ' The Biology of the Small White Butterfly (*Pieris rapae*)' by Dr. O. W. Richards, published in the *Journal of Animal Ecology*, Vol. 9, No. 2, pp. 243-288, Nov. 1940.

The range of food-plants for all the five White butterflies lies between Watercress (*Nasturtium officinale* R. Br.) No. 89 in " The London Catalogue of British Plants," 1925, and Wild Mignonette (*Reseda lutea* L.) No. 175. The latter is a favourite of

the Bath White (*Pontia daplidice*). In the past twenty years the most important immigrant White butterflies swarms have attacked Black Mustard (*Brassica nigra* Koch) No. 144 and Charlock (*B. sinapis (arvensis)* Kuntze) No. 146. The original food-plant is believed to have been the Dittander (*Lepidium latifolium* L.) No. 154, now rare and only to be found in twenty vice-counties; but still a very common weed in the Baltic marshes whence our immigrants mostly come.

This seems to point to preference for a peppery cress rather than any of the principal wild *Brassica* species—Sea Cabbage (*B. oleracea* L.) No. 138. Rape (*B. napus*) No. 139. Swede (*B. rutabaga* DC.) No. 140 and Turnip (*B. rapa*) No. 141. The cultivated turnips vary and those having hairy leaves are avoided in favour of smooth-leaved varieties.

Dr. Richards' experiments were carried out by planting rows of known wild food-plants amongst regular cabbage patches in the Biological Field Centre at Slough between 1932 and 1936 and by comparing the numbers of eggs laid on each and how the larvae fared. The insignificant Hedge Mustard (*Sisymbrium officinale* Scop.) No. 128 showed the highest percentage of eggs in August, but this may have been due to its profusion in the area. Next came a Nasturtium (*Tropaeolum majus*. a cultivated plant): followed by Cabbage. Swede. Sea-kale (*Crambe maritima* L.) No. 170. *Pieris brassicae* not *P. rapae*. Turnip. Mustard. Horse-radish (*Cochlearia armorica* L.) No. 125. Watercress. in that order.

It has been noted that. in cultivated fields of Crucifers. egg-laying takes place after sunrise on plants in the sun sheltered from wind and around the edge of a field rather than the centre. It is likely that in soil differing from that in Buckinghamshire, with different aspects, etc., different results may be found and it is hoped that Dr. Richards' experiments will be repeated, selecting other wild Crucifers within the London Catalogue range. It should be remembered that the larvae cannot develop satisfactorily except at some temperature above 54° F. and below 86° F., nor will eggs be laid below about 45° F. The object is to find a suitable weed to plant amongst our cabbages upon which the butterfly will prefer to lay, e.g. like the Nasturtium borders so often found in cottage gardens."

Members may also like to look up Professor F. Balfour-Browne's paper on the "Life-history of the Small Eggar Moth" in *Proc. Zool. Soc.*, 1933. pp. 161-180. "There is," he wrote, "all the difference between what the caterpillars will eat and what is a suitable food for the completion of the life-cycle. Moreover, certain plants are readily eaten when offered; other plants are eaten by partly grown caterpillars. but left untouched by newly hatched ones, and others again are eaten by partly grown caterpillars only if they are prevented from obtaining other food. Certain plants seem to be excellent food. and the larvae grow up at a normal rate. but never spin cocoons and never pupate; in fact. it appears as if something equivalent to vitamins is necessary to the larvae . . . ." "Mosher* found that certain foods produced only male moths; presumably this was not a case of sex determination by food. but of the females being eliminated owing to lack of something in the food . . . ." (p. 173). "It is clear that there are many factors affecting the food-range of a species. but it looks as if everything depends upon the plasticity of the species. All plants consist of protoplasm and cellulose. and from these the vegetarian insects obtain proteins. carbohydrates. and fats. and it seems that the selection of one plant rather than another must depend either upon the taste of the insect or upon the mechanical qualities of the plant. Therefore the apparent plasticity of the insect as regards food becomes mainly a matter of range and taste in the various bye-products of the plants. Uvarov. in his masterly summary on 'Insect Nutrition and Metabolism'† has devoted nearly four pages to the subject of the selection of food by insects . . . ." (p. 175). "But the whole question as to why growth and development should cease at certain stages on certain foods. why some larvae should fail to pupate. why some should pupate but fail to produce moths, and why on some foods only males emerge. can only be satisfactorily explored in conjunction with a biochemist" (p. 176).

The Editor believes that if the AES could amass information about insects, not necessarily only lepidoptera,

*Mosher, F. H. "Foodplants of the Gipsy Moth in America." *U.S. Dep. Agric. Bull.*, ccl, 1915.

†*Trans. Ent. Soc. London*, 1938, pp. 272-276.

feeding on foodplants other than the normal ones, we should be able to provide worthwhile data for a serious biochemical study, such as Professor Balfour-Browne looked forward to twenty years ago. Will some member volunteer to act as collator?

The first such item has come to hand from Mr. W. G. C. Booker (1742) who found four larvae of the Cinnabar Moth (*Hypocrita jacobaeae*) on Wild Parsnip (*Pastinaca sativa*) whereas the normal foodplants are Ragwort (*Senecio jacobaea*) and Groundsel (*S. vulgaris*). " I tried the larvae on Ragwort," he writes, "but they refused to have anything to do with it. When I put them back on Wild Parsnip, they fed up and pupated. Three of the four emerged as moths rather deeper in colour than those fed on Ragwort."

In the same field, but in reply to Mr. J. P. C. Ward's query on p. 90, Mr. G. B. Taylor (2016) states that the larvae of the Toadflax Pug (*E. linariata*) will eat the flowers of the Snapdragon (*Antirrhinum majus*) and of garden *Linaria* hybrids.

" Yellow Toadflax occurs in West Middlesex in the Uxbridge-Harefield-Northwood area, and more plentifully just over the border in Buckinghamshire, where it grows, among other places, besides the Western Region railway main line. It may well occur in Southall in a similar locality as well as to the North of the Borough near Western Avenue.

Some of the Buckinghamshire colonies of Toadflax have had the larvae on them about mid-September nearly every year since 1936 and the moth is apparently well established there."

The oddest example of polyphagy is cited by Mr. Lovell, Southville Boys' Insect Club (1567): " I had a batch of *Cricula andrei* (a Silk Moth) which made a promising start on the cellophane in which the ova had been wrapped, attacking it in close formation just as if it were a leaf."

LARVAE ATTRACTED TO LIGHT

During the past season I have had a few full-fed larvae of the Arctiidae group of moths come to my M/V light-trap in the garden. Also one larva of *Apatele aceris* (Sycamore Dagger) crawled into the trap.

The species noted were *Spilosoma lubricipeda* (White Ermine)—two larvae were in the trap and three found just outside; *S. lutea* (Buff Ermine)—three in the trap and five others within a yard of it on the lawn; *Arctia caja* (Garden Tiger)—one on the trap and two just outside on the lawn; *A. villica* (Cream-spot Tiger)—two just outside; and *Phragmatobia fuliginosa* (Ruby Tiger)—eight just outside.

The larvae outside were seen to be making good progress along the grass whilst they were in the light of the lamp, but most of them halted and stayed just outside when they came to the area of shadow thrown by the body of the trap.

I have a large door in one side of my trap. When this is open a segment of light breaks the area of shadow, and as I saw one larva of *aceris* actually crawling into the trap at this point, I presume all the others had got in by the same way.

I should be pleased to know if other members have had larvae in their traps.

Alan Kindred (1707*).

REVIEWS

The Spider's Web by Theodore H. Savory, M.A., F.Z.S. Pp. 154, with 8 plates in full colour, 19 half-tone illustrations and 35 line drawings in the text. Published by Frederick Warne, London, 1952. Price, 12/6.

Few naturalists in the field can have failed to be intrigued by spider's webs at one time or another, and many will have wondered how the orb web spinners are able to construct such intricate and delicate structures.

Although Mr. Savory does not pretend he knows all the answers, he has assembled a wealth of knowledge on the subject of spiders' webs, the nature of the silk used in their construction, the way the orb spinners build their webs, and how they use them to catch their prey. He has even written a chapter on their preservation in spite of their delicate and often ephemeral nature.

The book can be confidently recommended, not only as an introduction to the subject for anyone making a more serious study of spiders and their webs, but also for the large numbers of naturalists who, although their chief interests may lie in other directions, would inevitably like to know more about the webs that can

hardly escape their notice in the field, and especially the orb webs when their beauty is enhanced by a deposit of dew or frost.

The book has a small glossary and a useful bibliography at the end, though several papers referred to in the text are not included, such as " Akerman, C., 1932—On the spider Miagrammopes sp. which constructs a single-line snare. *Ann. Natal Mus.*, pp. 137-143," which is referred to on page 138, and " Nørgaard, E., 1943—Investigations on the feeding habits of Linyphia (Aran.) *Ent. Medd. Kjøbenh.*, pp. 82-100," which is referred to on page 131.

Although the orb web is dealt with at considerable length, some of the other types of webs are rather more summarily dismissed. For example, the triangular web of ***Hyptiotes*** might have had a little more consideration, nor is it made clear that when a fly hits the web, the spider lunges forward a distance of 2 cms. or more, as described by the Marples in their paper, " Notes on the spiders *Hyptiotes paradoxus* and *Cyclosa conica*, 1937," and which I have found a very noticeable feature when *Hyptiotes paradoxus* builds and uses its web in captivity.

A reference to *Atypus affinis* and to the interesting and amusing paper by Fred. Enock in *Trans. Ent. Soc. Lond.*, 1885, pp. 389-420, which describes how this spider uses its silken tube to catch its prey, might have been included, but perhaps the interesting tube this spider constructs was not considered to be a true web. It is, however, an easy species to study in captivity, and if placed in a jam jar about two-thirds full of earth, it will often build its ' web ' and catch earwigs and centipedes, and similar prey, as described in Enock's paper.

Another subject that deserved more notice is the sperm web used by the male to charge his palpi before mating, though it is appreciated that it was obviously impossible to include everything in the space available.

Mr. Savory seems to imply that he does not think the web of an orb spinning species is as a rule characteristic, or that the spider can be named in its absence by a study of its web, and he shows that such points as the number of radii and the angle between adjacent radii are not very constant (pages 52-56). But as pointed out by Bristowe in ***The Comity of Spiders***, Part II, " long acquaintance with the spinning work of orb weavers has satisfied me that the typical web of most if not every species can be recognised without seeing the weaver herself . . . but it is not always easy to explain precisely how recognition has been accomplished." Even so, many webs possess characteristic features that are a great help when learning to identify the web of a particular species and I feel sure a brief description of the webs of some of the commoner orb spinners would have been very helpful.

As regards the paper, printing and binding, these show the uniform excellence that one has come to expect when an addition to Warne's well-known Wayside and Woodland series makes its appearance. The publishers are specially to be congratulated on producing such an elegant and well-finished book at the low price of 12/6.

A. A. D. La T.

British Butterflies and Moths by Isobel St. Vincent, illustrated by Helen Haywood. 64 pp., of which 8 are colour illustrations, 12 full-page line drawings and 12 half-page. Blackie & Son, 1952. Price, 5/-.

All the British butterflies and about forty of the larger moths are covered in this children's reference book. The text is laconic, but accurate and helpful, conceived as an accompaniment to the illustrations which artistically " tell the story " by showing egg (magnified), larva with foodplant, chrysalis and imago, drawn or painted with sympathy and as they are likely to be met in the field. The colouring has not the accuracy of the modern four-colour reproduction from photographs and is somewhat schematic, but it is not crude. The arrangement is not taxonomic, but mainly by habitat; e.g. groups are entitled " Butterflies of the Woods and Copses," " of the Meadows and Hillsides," " of the Gardens and Lanes "; " Moths of Gardens and Orchards," " of Woods, Lanes and Fences." Recommended as providing foundation knowledge for the beginner at any age.

J. C.

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EDITED by W. J. B. CROTCH, M.A., A.K.C.

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ANNUAL EXHIBITION 1952

"Better than ever" was the general opinion. Exhibits were more numerous and more interesting, and many Orders of Insecta were well represented. There were so many visitors that the Council will have to consider whether a larger hall should be used in future.

One of the most attractive exhibits was that derived from our overseas members. The Council had asked each one to send some unreturnable specimen, remembering that common insects from other parts of the world would be attractive in London. The response by fifteen members was beyond all expectations, and we hope that this will become a regular feature of the Exhibition. A large map of the world indicated by coloured threads the place of origin of each exhibit, ranging from three members in the United States to a junior member in New Zealand. One member even sent a specimen new to science, which will, of course, be presented to the British Museum. We propose to publish a fuller account of this exhibit next month.

The Silk Moth Group once again staged a large and very popular show. Their great achievement this year is the creation of a new hybrid race of *Philosamia cynthia* which has been developed co-operatively by the Group by hybridizing *P. cynthia canningi* and *P. cynthia obscura*. The life history of *P. cynthia* (Ailanthus Silkmoth) was splendidly shown in photographs. Living larvae of *Antheraea mylitta* (Tussore Silkmoth), *A. pernyi* (Chinese Oak Silkmoth), *A. roylei* (Himalayan Silkmoth), *Actias selene* (Indian Moon Moth) and *Platysamia cecropia* (Robin Moth) were a great attraction to the younger visitors.

It would be difficult to do justice to the many other lepidoptera exhibited without a catalogue which would take up the whole of this *Bulletin*. Live larvae included *Anarta myrtilli* (Beautiful Yellow Underwing), *Hylophila prasinana* (Green Silver Lines), *Lophopteryx baja* (Dotted Clay), *Plusia pulchrina* (Beautiful Golden Y) and a Lappet from Kenya (*Bombycopsis conspersa*), a sort of vicarious stray from the overseas stall. Among the set specimens of British species the Blues and Hairstreaks were the most numerous. A series of *Erebia epiphron* (Small Mountain Ringlet) (see p. 98), with excellent photographs of its habitat in Cumberland and an account of its hunting made an attractive exhibit. A case showing the distribution of the races of *Polyommatus icarus* (Common Blue) was of considerable scientific interest.

Apparatus is usually a feature of our Exhibitions and the latest Mercury Vapour Trap and the latest breeding cage (see p. 86) were on view.

Photographic studies of insects were of a high standard, including many Orders.

Coleopterists showed the biology of *Cylindronotus laevioctostriatus*, a series of Chrysomelidae, and some interesting and well executed watercolours of water, waterside and chafer beetles by a junior member.

Hymenopterists were represented by hornets (*Vespa crabro*), the life history in specimens of *Cimbex femorata* (Great Birch Sawfly) and some delicious Essex honey!

Diptera, as usual, were well represented. Among them were a box of insects bred from a Wasp's nest, ten species of Conopidae, three Tachinids with a list of their Lepidopterous hosts, and thirteen species of Diptera resembling bees and wasps.

Odonata had a series of *Sympetrum striolatum*, *S. sanguineum*, and *S. danae*.

A case of British Orthoptera and a live specimen of *Mantis religiosa* (taken on holiday in France) showed that this Order is not neglected.

Mr Bushby of the London Zoo spent a busy afternoon answering the questions about his fascinating live specimens of scorpions, mantids, water bugs with eggs on the male's back, Psychids (as described in the August *Bulletin*) and other insects from many parts of the world.

Many members find the lectures the most interesting feature of the Exhibition and it is not surprising to see some stay on for the whole series. This year the standard was well maintained by Dr. C. B. Williams on "Insect Migration," Mr. W. H. T. Tams on "Uses and Abuses of Entomological Names and Terms," and Mr. E.

E. Syms on "Burying Beetles". Demonstrations in setting Diptera, Coleoptera and Lepidoptera were so popular that the demonstrators were almost smothered by the spectators.

L. W. S.

SCIENTIFIC METHOD IN ENTOMOLOGY (2)

(*Continued from p. 103*)

Whenever we make any comparative studies in biology we find ourselves studying variation. There are different kinds, but the kind we are usually most interested in is what is called continuous variation. To give an illustration of this, let us suppose that we wish to study the variability in the size of the wings of some species of butterfly—say, the Cabbage White. A glance at any cabinet series of this insect will show us at once that some specimens are bigger or smaller than others; indeed, it would be difficult to pick out a series which are exactly the same size, although there will be fewer on the larger or smaller side than there are of an "average" size.

Obviously the first step in our experiment will be to measure the wings of the Cabbage White—ideally all the Cabbage Whites in existence. We will now have an array of figures before us, but even the most mathematically-minded will have difficulty in obtaining much information from them. What we must do, then, is to draw a diagram or graph to show how these measurements are related to one another.

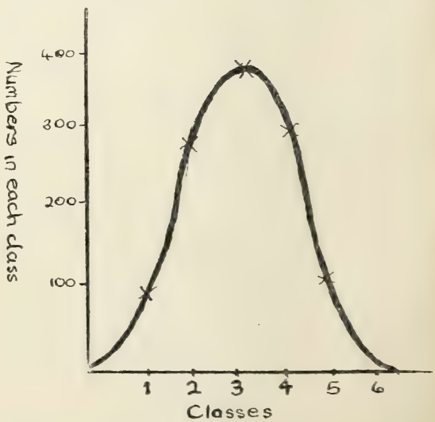
One way of doing this is to find the smallest measurement recorded on our table. Suppose it is 24 millimeters from root to tip of the fore wing. We now start from this and group our measurements into classes, so that class 1 will be all the insects which measure from 24 to 25 millimeters, class 2 will be all those falling between 25 and 26 and so on until we have covered all the readings. We can now draw our graph with the classes, from 1 to whatever our highest value is, along the base line, and the number of insects occurring in each class up the side, the result being something like the figure opposite.

By drawing a vertical line through the summit of this curve so that it cuts the base line we read off the most frequently occurring measurement. Because it is the most fashionable value, the statisticians call it the *mode*. It is not really the average value, but means much the same thing.

I stated that the ideal thing, in order to construct this curve, would be to measure every Cabbage White butterfly: but this really implied not only those which are in existence at the moment, but also all those which have existed, and those which will exist in the future—a clearly impossible task. We must, therefore, qualify our statements by naming a place and a time, such as "Distribution of wing size in the Cabbage White population on the Isle of Man in August 1951." Even now it implies that we have examined every Cabbage White on the Isle of Man during the month of August 1951, and we could never be certain that we had captured them all. We must, therefore, take a representative sample of this population, and from measurements carried out on this sample we can infer, with some confidence, the state of affairs in the population as a whole.

Now, how big must our sample be in order that we can be sure that it is a good representation of the entire population? Obviously if our sample consists of only ten specimens, there would be quite a strong risk that we had chosen, accidentally, ten small insects, and our mode would be correspondingly biased. How, then, are we to know whether our sample is large enough?

In order to give a good illustration of this type of problem, I cannot do better than quote a hypothetical experiment devised by R. A. Fisher and described in his book, "The Design of Experiments." In this case, however, he was dealing with another type of variation, namely discontinuous,



where we have a choice of either one thing or another, rather than an infinite range of slight variations.

The problem was as follows. A certain lady claimed to be able to distinguish, by tasting a cup of tea, whether the milk was added first or last. So in order to test whether the subject was justified in her claim, it was decided to pour out eight cups of tea, four in which the milk was added to the cup first, and four in which the tea was put in first, and ask her to classify them correctly. Now, in order to choose four objects out of eight, we have all the eight to begin with; then (as we have chosen one) seven remain; then six; then five; or in other words $8 \times 7 \times 6 \times 5 = 1680$ ways. But here we have chosen them in every possible order, and as the order does not matter, we must correct by dividing this number by $4 \times 3 \times 2 \times 1 = 24$. Working this out, we therefore find that there are 70 ways of choosing the four cups out of eight. Our subject, therefore, has a one in seventy chance of getting the answer correct by pure luck even if she possessed no discriminatory powers at all, which may be considered quite significant.

However, the subject may not claim to be right every time, but to score correctly more often than not. If the subject gets one wrong in one set of four with a corresponding error in the other set, she will stand a 16 in 70 chance of getting this result by luck, which is not really significant at all. However, if we enlarge our sample to ten cups of tea, we may allow for one mistake and still get a reliable result. A much better method would be to keep to the original eight cups, but instead of having four of one sort and four of the other, determine the treatment of each cup by some purely random procedure such as throwing a die or drawing numbers out of a bag. Not only would the subject be able to make only one mistake instead of two, but the whole method is on a much sounder mathematical basis.

An experiment of this kind where a small sample is taken from an infinite population (the eight cups are the sample and all the cups of tea which have been, are being, or will be made is the population) is quite satisfactory for discontinuous variation and could be used to test some such hypothesis as " A certain species of insect regularly produces more males than females." With continuous variation, however, our samples must necessarily be much bigger; indeed, the bigger they are the better. We must also make certain that our samples are taken quite randomly from our chosen population. This is often quite difficult to do, human nature being what it is.

You will have seen that it is necessary for any soundly planned experiment to involve figures, and in order to get these figures we must measure something. It is sometimes very difficult to find some factor which can be measured. For instance, if you were judging a beauty contest, you could not say that one competitor was 4·53 times more beautiful than another.

One way of dealing with such a problem is to get a number of independent observers to arrange the objects or occurrences in order of value or significance and then see what agreement there is beween their observations. This sort of approach must be made only as a last resort, because a little ingenuity will often suggest a more straightforward way out.

To sum up, then, we have seen that most of our problems in entomology can be approached in a cool and logical manner. We must define our experiments precisely, decide what the population is, and how best we may sample it, and what relation our sample bears to it. Finally, we can calculate by simple mathematical procedures, how often pure chance would be likely to give us the results we have obtained. I have avoided going into the actual equations and arithmetic involved, as this can be obtained from any elementary textbook of statistics.

(*To be continued*)

P. L. Bradley (1360).

BUMBLE BEES (10)

(*Continued from page 105*)

THE KEYS

These keys are purely artificial in that they do not show the relationships between the species. Fortunately the colour characteristics of each species are fairly reliable in Britain and make a key of colour characters both possible and practicable. Since it is artificial, the key cannot be infallible; but it should serve for the great majority of cases and, provided the specimen is compared with the species description, it should be perfectly satisfactory.

KEY FOR DETERMINING SEX AND GENUS

1 (4) Abdomen of seven visible segments, ending in a flat tip, antennae of thirteen segments ....Male
2 (3) Posterior tibiae convex, dull and covered with branched hairs on outer surface ....*Psithyrus*
3 (2) Posterior tibiae flat or concave, rarely convex, usually shiny in centre; but if hairy the hairs are unbranched *Bombus*
4 (1) Abdomen of six visible segments ending in a pointed tip, antennae of twelve segments ....Female
5 (6) Hind tibiae convex, hairy on outer surface ....*Psithyrus*
6 (5) Hind tibiae concave, hairless and shiny on outer surface ....*Bombus*

KEY TO FEMALES OF GENUS BOMBUS

Note: Where " segment 1 " is used it refers to the first visible segment of the abdomen (really segment 2). Other segments follow in order.

1 (24) Ground colour black.
2 (19) One or two yellow bands present on thorax.
3 (12) Two yellow bands present on thorax.
4 (11) Tail white or dull brown.
5 (10) Anterior yellow band on thorax broader than posterior yellow band measured across the middle.
6 (9) Yellow bands all clear and bright.
7 (8) Face short ....*B. jonellus*
8 (7) Face long (very) ....*B. hortorum*
9 (6) Yellow bands usually rather dull and narrow, face fairly long yellow band on segment 1 not well marked ....*B. subterraneus*
10 (5) Yellow bands on thorax of equal width measured across the middle. Often dark coloured; face long ....*B. ruderatus*
11 (4) Tail red ....*B. lapponicus*
12 (3) Only anterior yellow band present on thorax
13 (18) Tail white or tawny.
14 (15) Tail tawny or white with a brown base ....*B. terrestris*
15 (14) Tail white.
16 (17) Yellow band on segment 2 interrupted in the middle or continued on to the sides of segment 1. Tail may have a red base ....*B. soroënsis*
17 (16) Yellow band on segment 2 entire, does not continue on to sides of segment 1 ....*B. lucorum*
18 (13) Tail red
Greater part of abdomen red ....*B. lapponicus*
Only tail red ....*B. pratorum*
(Tail bright red, uncommon var. of *B. lapidarius*)
19 (2) No yellow bands present on thorax
20 (23) Tail red
21 (22) Hairs of corbicula black ....*B. lapidarius*
22 (21) Hairs of corbicula red or red-tipped ....*B. ruderarius*
23 (20) Tail not red
Insect completely black or showing traces of a brownish tail. Melanic form of ....*B. ruderatus*
24 (1) Ground colour not black.
25 (28) Dark (often black) band between wings; ground colour yellowish.
26 (27) Tail red ....*B. sylvarum*
27 (26) Tail not red ....*B. distinguendus*
28 (25) No dark band between the wings
29 (30) Black hairs amongst pale ones on abdomen, hairs of corbicula usually black ....*B. agrorum*
30 (29) No black hairs amongst pale ones on abdomen, hairs of corbicula usually yellow
31 (32) A few black hairs present on thorax; brown band on segment 2 usually well marked ....*B. humilis*
32 (31) No black hairs present on thorax; brown band on segment 2 very faint or absent
33 (34) Underside pale ....*B. muscorum*
34 (33) Underside black; corbicular hairs black ....*B. smithianus*

KEY TO FEMALES OF GENUS PSITHYRUS

1	(8)	There is white on the abdomen	
2	(5)	Usually no yellow hairs on segment 1	
3	(4)	Segments 1 and 2 grey, tail white, sides of segment 3 lemon yellow	*Ps. bohemicus*
4	(3)	Segments 1 and 2 black, tail white, sides of segment 3 very pale yellow	*Ps. vestalis*
5	(2)	Usually yellow hairs present on segment 1.	
6	(7)	Segment 5 white, crescent shaped mark on sixth ventral segment	*Ps. barbutellus*
7	(6)	Segment 5 not white, chestnut (sometimes black) abdomen incurved	*Ps. sylvestris*
8	(1)	There is no white on the abdomen	
9	(10)	Abdomen yellow or black or any intermediate colouring	*Ps. campestris*
10	(9)	Abdomen black with red or dull red tail	*Ps. rupestris*

KEY TO MALES OF GENUS BOMBUS

1	(10)	Tail white	
2	(7)	Yellow on abdomen, when present, always on segment 1 and frequently on the base of segment 2 also.	
3	(4)	Yellow bands on thorax equal in width measured across the middle, face long	*B. ruderatus*
4	(3)	Anterior yellow band on thorax broader than posterior one, measured across the middle	
5	(6)	Face short (Beware of possible confusion with *Psithyrus* spp.)	*B. jonellus*
6	(5)	Face long	*B. hortorum*
7	(2)	Yellow on abdomen always present on the whole of segment 2, often very extensive	
8	(9)	Hind metatarsi not tapering towards base, more or less parallel-sided	*B. lucorum*
9	(8)	Hind metatarsi tapering towards base, tail may have a red base	*B. soroënsis*
10	(1)	Tail not white.	
11	(24)	Tail not red or black	
12	(13)	Ground colour black, tail tawny, one yellow band on thorax and one on segment 2	*B. terrestris*
13	(12)	Ground colour not black	
14	(17)	Black band between wings; ground colour dull yellow	
15	(16)	Black hairs always present on segment 2, usually in the form of a black band	*B. subterraneus*
16	(15)	No black hairs on segment 2	*B. distinguendus*
17	(14)	No black band between the wings.	
18	(19)	Black hairs amongst pale ones on abdomen, hairs of corbicula usually black, joints of antennae much swollen posteriorly	*B. agrorum*
19	(18)	No black hairs amongst pale ones on abdomen.	
20	(21)	A few black hairs present on thorax; well marked brown band on segment 2	*B. humilis*
21	(20)	No black hairs present on thorax, usually no sign of a brown band on segment 2	
22	(23)	Underside pale	*B. muscorum*
23	(22)	Underside dark, hairs of corbicula black	*B. smithianus*
24	(11)	Tail red or black	
25	(28)	Tail black	
26	(27)	Thorax not black, tawny or ginger	*B. agrorum*
27	(26)	Thorax black, whole insect black, melanic form of	*B. ruderatus*
28	(25)	Tail red	
29	(30)	Face black, ground colour dark, antennae very long	*B. ruderarius*
30	(29)	Face yellow	
31	(32)	Second and following segments of the abdomen red	*B. lapponicus*
32	(31)	Tail only red	
33	(36)	Hairs on top of head black, face yellow	
34	(35)	Ground colour greenish yellow	*B. sylvarum*
35	(34)	Ground colour black	*B. lapidarius*
36	(35)	Hairs on top of head yellow, face yellow (the yellow is clear, not greenish or dull)	*B. pratorum*

KEY TO MALES OF GENUS PSITHYRUS

1	(4)	There is no white on the abdomen	
2	(3)	Yellow, black or intermediate coloured abdomen	*Ps. campestris*
3	(2)	Red or dull red tail	*Ps. rupestris*
4	(1)	There is white on the abdomen	
5	(8)	Sides only of segment 3 yellow or white	
6	(7)	Yellow on segment 3 usually pronounced, segment 3 of the antennae shorter than segment 5	*Ps. vestalis*
7	(6)	Yellow on segment 3 usually pale or even white, segment 3 of the antennae approximately equal in length to segment 5	*Ps. bohemicus*
8	(5)	Sides of segment 3 not white, or *whole* of segment 3 white.	
9	(10)	White does not extend on to segment 6, segment 7 usually reddish	*Ps. sylvestris*
10	(9)	White usually extends on to segment 6, segment 7 is black and not reddish	*Ps. barbutellus*

T. B. Poole (1681).

WINGLESS FEMALE MOTHS

If you have not already thought about obtaining those moths that appear in the dreary winter months, now is the time to begin. Just venture forth into the nearest woodland after dark with your pockets generously filled with pill boxes. It is also essential to put on plenty of warm clothing; and in addition a pair of rubber boots, though not essential, can be very useful. No further equipment is required, apart, of course, from a torch, which should preferably be the kind that can be clipped on to one's clothing, so that one's hands are free for the necessary boxing of insects revealed by its light.

It is a mistake to consider that a representative selection of Wingless Females is difficult to obtain. They are, undoubtedly, very difficult to find during daylight hours; but they are nearly all quite common, and after dark their whereabouts are easily seen because of the attendant winged males. There are, of course two species of Vapourer whose females are apterous, but these will not be dealt with in this article as their time of appearance is in a very different part of the year.

The first two to be noticed are likely to be the Winter Moths, *Operophtera fagata* and *O. brumata*. *O. fagata* is the larger and paler. Let the males find the females for you and remember their identification of the female is likely to be more accurate than yours. *O. fagata* favours grasses and twigs more than tree trunks and *O. brumata* is often in profusion on the boles of trees; where the males are gathered a few females will soon be found.

A little later to appear is the Scarce Umber (*Erannis aurantiaria*). This species favours twigs and may be found in woods, often abundantly together with the females.

In January, search the hawthorn hedges after dark for the Early Moth (*Theria rupicapraria*). These are normally found in fair quantity, even sometimes actually when there is snow on the ground. It is recommended, however, that when there is snow or excessively hard frost searching should not be undertaken.

February brings in profusion the Dotted Border (*Erannis marginaria*) which can easily be confused with *E. aurantiaria*, except for the fact that their times of appearance are so widely separated. A little later in the month the Spring Usher (*E. leucophaearia*) and the Mottled Umber (*E. defoliaria*) appear, the male of the former being easily found on oak trunks in the day time. The female seems to be rather elusive at night, but patient searching where the males occur will bring its reward. Late February and March is the time for the Pale Brindled Beauty (*Phigalia pedaria*) and the Small Brindled Beauty (*Apocheima hispidaria*). All the February moths seem to favour the trunks of trees for mating purposes, except for *A. hispidaria* which prefers the lower branches. Do not omit looking at the bushes, however, as there are no fixed rules.

The March Moth (*Alsophila aescularia*) may be found on hawthorn twigs in hedgerows, but although the male is comparatively common, being particularly attracted to electric light, the females are not often seen. However, patient searching after dark where the males are found must eventually result in success.

Those members who can visit the haunts of the Rannoch Brindled

Beauty (*Poecilopsis lapponaria*) and the Belted Beauty (*Nyssia zonaria*) will no doubt find that a close examination after dark of suitable twigs in their respective haunts will eventually be rewarded.

A slightly unusual setting technique is required with Wingless Females. In the case of one or two, notably *E. marginaria*, it will be necessary to pay some attention to the stubby wings; but in the main these are best left alone to dry in the position in which they remain after the insect has been killed. In order to have neat and tidy looking specimens, it is essential that all wingless females should possess their full six legs, and these should be arranged with a setting needle in as even a manner as possible to give the appearance of the insect standing in a natural position. The conventional type of setting board is not used in the ordinary way. The flat part, however, on which the wings would normally be spread, offers a suitable plane surface for pinning and arrangement.

P. C. Lemasurier (978).

A CHIRPING BEETLE

I have not seen or heard it mentioned before that *Cychrus rostratus* Linn. has the ability to chirp; however, while "bug-hunting" in Fisher's Wood, Bromley, I came across one chirping in a manner not unlike that of a grasshopper in sound. It had only about half the volume of the grasshopper's chirping, was of a higher pitch, and of a smoother quality. The beetle was lying still under a rotting log. I could not see from what organ the chirping was coming, but it was not any of the legs. I would like to hear other members' experiences of this and in what circumstances the beetle does "chirp."

C. M. Idle (2118).

REVIEWS

The Genitalia of The Group Noctuidae of the Lepidoptera of the British Islands. An Account of the Morphology of the Female Reproductory Organs. By F. N. Pierce, F.R.E.S. Second Edition, 1952. Facsimile. With a Foreword by A. A. Lisney, M.A., M.D., D.P.H., F.R.E.S., and Addenda and Corrigenda by W. H. T. Tams, A.L.S., F.R.E.S. Published by E. W. Classey, Feltham, Middlesex, 1952. Price, 30/-. Size 8½ ins. × 6 ins. Pp. 64, 15 plates.

The difficulties which to-day confront a publisher are so great, especially the cost of production, that it requires a brave man to venture to have a book like this reprinted. In this particular case, it was well worth the risk, for two reasons. First, there were only 100 copies of the original edition. Second, the book contained so many mistakes that much of it was misleading. It is now made available to all those who were unable to obtain the first edition, and it is at the same time a desideratum in the case of anyone possessing the first edition. To those intending to pursue the study of these structures two things are important:—(1) to possess this book as a guide, and (2) to remember that the drawings were made from preparations mounted under coverslips on microscope slides; the freshly prepared, unmounted specimen presents a much more satisfactory object for study. One day some enlightened person with the means to carry out the project will repeat this work with microphotographs instead of drawings—but it will be costly.

Prodromus Lepidopterorum Britannicorum. A Concise Catalogue of British Lepidopterous Insects, with the Times and Places of Appearance in the Winged State. By a Fellow of the Linnean Society. [A. H. Haworth.] T. Hurst, London, 1802. Facsimile Edition, E. W. Classey, Feltham, Middlesex, 1952. Price, 15/-. Size 9 ins. × 6¾ ins. Pp. 39 + 6.

To possess and know this little book is sheer delight. Let any lepidopterist look through it, and if he cannot afford to buy a copy, I defy him to offer any other reason for not wishing to! There are no pictures, but the treatment of the names to make evident their position in the classificatory system is highly engaging, and the little diagnoses in the simplest Latin are as instructive as they are easy to understand; in addition to which there are interesting footnotes about what were at that time new records.

W. H. T. T.

British Insects, by George E. Hyde, F.R.E.S. Pp. 96, with 4 coloured plates, 28 photographs and 6 text drawings. A. and C. Black, London, 1952. Price, 6/6.

In his introduction to this work, Mr. Hyde gives a short, but satisfactory general survey of the groups with which he is concerned. This is followed by three chapters in which the author treats his subject in a novel

way, for he adopts a definitely ecological approach. After discussing the insects found in houses and gardens, he introduces us to other types of habitat in which insects may be studied. These localities, with their many tenants, are so charmingly described that the interest of the young entomologist is bound to be attracted and maintained. In the same chapters, too, the information supplied will enable the beginner to recognise the main orders and families concerned, and even, in many instances, the individual species.

However, one should point out that Mr. Hyde's treatment of the different groups is somewhat uneven. For instance, the very popular Lepidoptera are dismissed in a few sentences, whilst to the Spiders and Harvestmen, which are certainly not insects, are devoted no fewer than two pages. By including the latter groups, we feel Mr. Hyde is assisting in the perpetuation of a very common error.

Following these chapters are others which deal successfully with the useful and harmful insects of this country and also with the standard methods of controlling the latter.

In concluding his text, the author gives a brief account of the methods of collecting, rearing and preserving the diverse forms he has mentioned.

As for the illustrations, these are of three types: coloured plates, photographs of many of the species discussed and a few drawings. For the photographs we have nothing but praise, and much the same applies to the coloured plates, although we consider it unfortunate that in some cases the Latin names are omitted, and that, despite the fact that the book bears the title "British Insects," on Plate 10 two foreign insects are depicted. Surely their places ought to have been filled by figures of appropriate British forms.

However, on the whole, the work is a distinctly good one, and we have no hesitation in commending it to serious beginners in Entomology.

J. W. H. H.

PUBLICITY

The object of these notes by your Publicity Secretary is to report what has been and is being done to recruit new members and to ask you as a member to suggest new methods and to help in publicising the work of the Society.

Potential new members may be (a) entomologists who do not know of the AES and (b) persons who might become entomologists through the encouragement of the Society.

There are probably few in the first category. We advertise regularly in two periodicals on an exchange basis; we advertise our Annual Exhibition in others; we are frequently mentioned in articles in Entomological papers; and the Prospectus has been sent to many known entomologists. This is a limited field and perhaps we have exhausted it. Those entomologists who are not members would probably not ascribe that shortcoming to ignorance of our existence.

The second category is larger, but it is more difficult to get into touch with its individuals. From time to time we have advertised in such papers as Discovery, Boys' Own Paper, The Scouter, The Scout. Such advertising is expensive and results have not justified the cost. The Prospectus has been sent to all known local Natural History Societies, but perhaps they have now forgotten about it. Members might help by bringing the Prospectus to the notice of their local Society from time to time. It has also been distributed to Youth Hostels to be placed in the Common Rooms and there may be other Youth organisations which would provide recruits. New entomologists are more likely to be found among the younger generation and the Society has a particular interest in this field. We have some 900 members and that may be "saturation point" but your Council hope and believe that it is not. In 1951 members were asked to take part in a recruitment drive and results were good but not spectacular. This drive should go on.

What can you do about it? Get in touch with someone of your acquaintance or living in your locality who might become a member and discuss the Society with him (or her). Ask the Publicity Secretary to send a copy of the Prospectus (which, apart from giving particulars of the Society, contains a valuable chart of insect orders) a specimen bulletin, a list of publications and a membership form. Get this literature for your local Natural History Society, Youth Club, etc.

Will overseas members please make a special effort?

The address of the Hon. Publicity Secretary is 10 Repton Road, Orpington, Kent.

L. W. S. (243).

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